Philadelphia Water Department Climate Change Position Statement

There is overwhelming consensus throughout the global scientific community that climate change is occurring and it is largely due to human activity. Climate change poses a significant challenge to water, wastewater and stormwater utilities across the nation. Impacts from climate change in Philadelphia include more rain, extreme storms, higher air temperatures, rising sea levels, and possibly increased drought. These impacts are happening now and will continue to grow in magnitude in the coming century.

The Philadelphia Water Department (PWD) provides drinking water to 1.6 million customers and wastewater services to 2.2 million people in the city and the surrounding suburbs. It is our obligation to prepare for the impacts of climate change and we have programs dedicated to mitigation, adaptation and building resiliency to ensure we can carry out our mission as your water utility. We are committed to working with the Office of Sustainability (OOS), other city agencies, partners, stakeholders, scientists, industry experts and officials from all levels of government to address this challenge.

We stay up-to-date on the latest science, regularly engage with climate experts, and continue to study the impacts that will affect our drinking water, waste water, and stormwater systems. Our critical systems include physical, or structural, assets like our treatment plants and pumping stations, as well as non-structural assets that include our source water quality and water treatment processes. We consider climate change in our long-term planning efforts and we are developing cost-effective adaptation strategies to minimize impacts and ensure that we continue providing high levels of service—clean, safe drinking water and environmentally progressive wastewater and stormwater services—to our current customers and future generations.

Climate Change Impacts on Philadelphia Water Department Systems

We are already seeing climate change impacts and in the coming century Philadelphia is expected to have a warmer, wetter future with more extreme weather events compared to historical observations.

- *Higher air temperatures* – Increased air temperatures naturally raise the temperature of water bodies, which can accelerate bacteria growth and deplete the oxygen supply for aquatic life. Warmer surface water temperatures can also have implications for the drinking water treatment process.
- *Sea level rise* - As sea levels rise, the salt line separating the freshwater from the Delaware River and the saltwater from the Atlantic Ocean could creep far enough upstream to reach PWD intakes, threatening to impact our drinking water treatment process. Sea level rise coupled with extreme storms are expected to increase flooding and coastal erosion.
- *Increased Rain and Extreme Storms* – Increased rain and storm intensity leads to more stormwater runoff which negatively affects the quality of our source waters, stresses our drainage system, degrades streambank stability and could lead to more combined sewer overflows as the carrying

capacity of our infrastructure is exceeded. Severe weather may also lead to increased flooding, which threatens aging infrastructure, critical facilities and private property.

- *Drought* – Seasonal drought may increase in duration and frequency, which could affect source water quality and quantity. Drought could substantially reduce river flows and available water supply, advance the salt line up the Delaware River, and accelerate the growth of algae. Low water levels may also make source waters more sensitive to contaminants and water emergencies.

Our Response

As a leader among water, wastewater and stormwater utilities, PWD employs innovative technologies, leading research and adaptive management strategies to ensure high levels of safety and service. The quality of drinking water in Philadelphia meets or exceeds what is required by the Pennsylvania Department of Environmental Protection and U.S. Environmental Protection Agency. We comply with the Safe Drinking Water Act, Clean Water Act and other regulations to ensure that our products and services consistently remain of the highest quality. Climate change has the potential to make it harder for PWD to meet these regulatory requirements, but we are planning and developing adaptation strategies to guarantee that we do.

While climate change presents new challenges to managing our water resources, the good news is that we are already working towards solutions; we have many of the necessary systems and programs in place to monitor, understand and respond to climate impacts. For years, PWD has followed the science and participated in discussions on climate change. As leaders in the industry, we are preparing for a future climate that will look different than the past.

Our part in addressing the global issue of climate change has taken a three-fold approach:

1. **Mitigate**, or lessen, PWD's contribution to climate change by saving energy and using renewable energy sources;
2. **Study** climate science and perform a comprehensive risk assessment to understand what impacts climate change will have on our drinking water, wastewater and stormwater systems;
3. **Adapt** to the expected changes by implementing proactive, cost-effective strategies that include incorporating climate considerations into the planning and design of projects.

We have dedicated programs addressing both climate change mitigation and adaptation and believe that responding and taking action now will reduce risks and save costs in the long term.

Philadelphia Water Department Energy Program

The treatment of water and wastewater requires a lot of energy. The PWD Energy Program seeks to reduce our energy footprint while maintaining the highest quality, dependable, affordable water and wastewater services. Our Utility Wide Strategic Energy Plan outlines an approach for the department to reduce energy use and greenhouse gas emissions by improving energy efficiency, utilizing renewable energy sources and recovering resources otherwise thought of as waste.

We continue to operate our facilities to minimize energy consumption and reduce greenhouse gas emissions by using energy efficient equipment and renewable energy sources wherever possible. Today, 10% of the electricity used by PWD comes from onsite renewable energy generation. Since 1990, PWD has seen a nearly 35% reduction in greenhouse gas emissions, equivalent to approximately 80,000 tons

of carbon dioxide emissions; that's the same amount of emissions produced by nearly 8,500 homes for a full year. We seek to reduce our greenhouse gas emissions 80% from 1990 levels by 2050, in support of the citywide efforts to significantly cut greenhouse gas emissions by mid-century. Using onsite fuel and renewable electricity promotes energy independence at our facilities, and protects PWD's operations from volatile energy rates.

In addition to efficient operation of our facilities and infrastructure systems, many of the energy projects that help us reach our reduction goals extract energy from materials typically thought of as waste.

- *Biogas Cogeneration* – In 2013 we commissioned a new facility to capture methane generated from the sewage treatment process at the Northeast Water Pollution Control Plant. The captured biogas can provide up to 85% of the electrical requirements for plant operations. On average, the captured biogas from this facility produces 35 million kilowatt hours of energy, enough to power 3,365 homes in Pennsylvania for one year.
- *Aircraft Deicing Fluid* – In the winter of 2008, we began accepting aircraft deicer from the Philadelphia International Airport to feed to our anaerobic digesters at the Southwest Water Pollution Control Plant. The addition of deicing fluid increases the production of energy-rich methane gas that we use to power plant operations while keeping the deicing fluid, which is toxic to both humans and animals, out of our waterways.
- *Biosolids Recycling* – Since 1980, we have been safely treating and processing biosolids, the residuals resulting from the wastewater treatment process, from Philadelphia's three water pollution control plants. Since 2012 biosolids have been thermally dried into environmentally beneficial, pathogen-free pellets used as organic fertilizer and renewable fuel.
- *Solar Panels* – In 2010 we installed 1,014 solar panels at our Southeast Water Pollution Control Plant which generate a portion of the electricity that powers plant operations. These solar panels have an expected annual energy generation of over 300,000 KWh, which is equal to the electrical energy needed to power nearly 30 homes annually.

The Climate Change Adaptation Program

In 2014 PWD started a program dedicated to climate change adaptation. The primary goal of the Climate Change Adaptation Program (CCAP) is to better understand the impacts that climate change will have on PWD's infrastructure and reduce the risks and associated expenses from those impacts by identifying and implementing effective, achievable adaptation strategies. The CCAP also works with other city agencies and partners to share information, leverage resources and ensure that city-wide adaptation efforts are coordinated.

The CCAP stays up-to-date on the latest climate science, which can change rapidly as climate models and data resolution improve, and works closely with the Office of Sustainability and researchers to understand what climate change looks like on a local level. Much of the information and data we use comes from an August 2014 report titled *Useful Climate Information for Philadelphia: Past and Present* that was developed by the Office of Sustainability (OOS) and their consultant, ICF Incorporated. The report contains climate projections and analysis specific to Philadelphia.

Currently, CCAP is working on a thorough risk assessment to evaluate, in detail, the major impacts of climate change in Philadelphia and how they will affect our drinking water, wastewater and stormwater

systems, both structural and non-structural. The risk assessment involves working with environmental models and data analysis tools that use climate data for Philadelphia as well as observed data collected locally. Once the comprehensive risk assessment is complete, results will inform adaptation strategies that will be integrated into existing programs, inform major investments and guide operational and design standards. You can learn more about the CCAP by clicking here.

An Example of Adaptation in Action

PWD is already changing its operational approach to increase resilience to a wetter climate. In 2011, we initiated *Green City, Clean Waters*, a 25-year, multi-billion dollar program, to implement green stormwater infrastructure throughout the city. Green stormwater infrastructure (GSI) works in synergy with traditional infrastructure, like tunnels and tanks, to capture stormwater runoff, thereby reducing combined sewer overflows and some localized flooding. Since GSI uses vegetation like trees and plants and soils and natural processes to capture and infiltrate runoff, it also helps cities adapt to and mitigate climate change in the following ways:

- Reduce the urban heat island effect
- Recharge groundwater reserves
- Absorb carbon dioxide from the atmosphere
- Naturally filter and clean stormwater runoff that would have entered our sewer system to be cleaned at a wastewater treatment plant

PWD revised city regulations to require most new development in Philadelphia to manage the first inch and a half of rain that falls on-site, increasing the use of green infrastructure. In the past, urban development often meant more hard surfaces that lead to more stormwater runoff, causing localized flooding and degradation of water quality in streams and rivers. Now, resiliency is built into the framework for growth in Philadelphia. Furthermore, since green stormwater infrastructure is characterized by many decentralized projects throughout the city, the design and location of these systems can more easily be modified to accommodate changing climatic conditions than traditional infrastructure. Learn more about Green City, Clean Waters at http://www.phila.gov/water/sustainability/greencitycleanwaters/Pages/default.aspx .

In Summary

Around the world and in Philadelphia, climate change is happening and we're feeling its impacts. At PWD, we're up on the latest science, we're studying climate impacts and we're preparing adaption strategies to build resiliency and ensure that we can carry out our mission well into the future. We have two programs dedicated to addressing climate change, one focused on mitigation and one focused on adaptation, and we're continuing to build resiliency through our *Green City Clean Waters* plan, long-term water and wastewater plans, and the efficient operation and management of our infrastructure systems. Furthermore, we are working with other city agencies and stakeholders to ensure that the city of Philadelphia is prepared for the future. We cannot prevent climate impacts from happening but we can work to mitigate and adapt to its impacts by considering climate change in all of our planning

efforts. Together we can ensure that Philadelphia continues to thrive in a future with warmer, wetter and more extreme climatic conditions.

Additional Resources:

For more general information about climate change, visit:

- The National Climate Assessment FAQs page
- The United States Environmental Protection Agency page on climate change
- The NASA website on climate change
- Climate Central

For more information about climate projections and impacts for the Northeast and Philadelphia, visit:

- *Useful Climate Information for Philadelphia: Past and Future* by ICF Incorporated and OOS
- *Growing Stronger: Toward a Climate-Ready Philadelphia* by ICF Incorporated and OOS
- CUSP Philadelphia projections
- The National Climate Assessment page on the Northeast

For more information about Philadelphia's climate change adaptation and mitigation efforts, visit:

- The City of Philadelphia's Office of Sustainability website
- *Greenworks: A Vision for a Sustainable Philadelphia* by OOS