PFAS Community Engagement – Horsham, PA (Mid-Atlantic)

Per- and Polyfluoroalkyl Substances

July 25

10:00am - 9:00pm

July 25, 2018

Hatboro-Horsham High School

899 Horsham Rd, Horsham, PA 19044

Welcome and Opening Remarks

Cosmo Servidio
Regional Administrator, Region 3

Peter Grevatt
Director, EPA Office of Ground Water and Drinking Water

Welcome to the PFAS Community Stakeholder Meeting

EPA held a National Leadership Summit in Washington, D.C. May 22-23, 2018, that brought together federal, state, tribal and local partners.

1. EPA will initiate steps to evaluate the need for a maximum contaminant level (MCL) for PFOA and PFOS. We will convene our federal partners and examine everything we know about PFOA and PFOS in drinking water.
2. EPA is beginning the necessary steps to propose designating PFOA and PFOS as "hazardous substances" through one of the available statutory mechanisms, including potentially CERCLA Section 102.
3. EPA is currently developing groundwater cleanup recommendations for PFOA and PFOS at contaminated sites and will complete this task by fall of this year.
4. EPA is taking action in close collaboration with our federal and state partners to develop toxicity values for GenX and PFBS by this summer.

Draft July 10, 2018

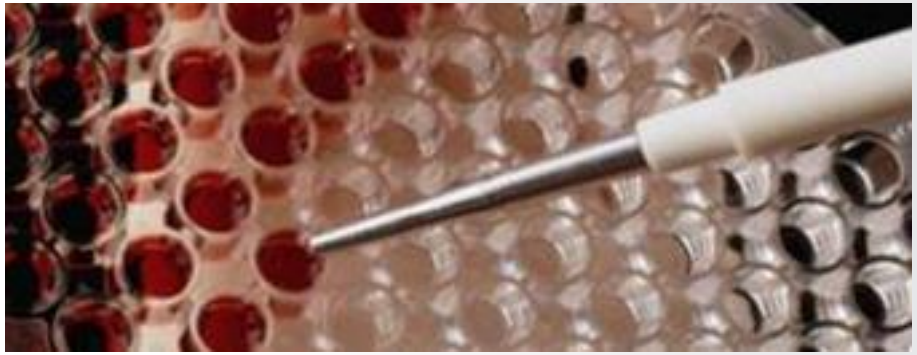
US EPA
PFAS Research and Development

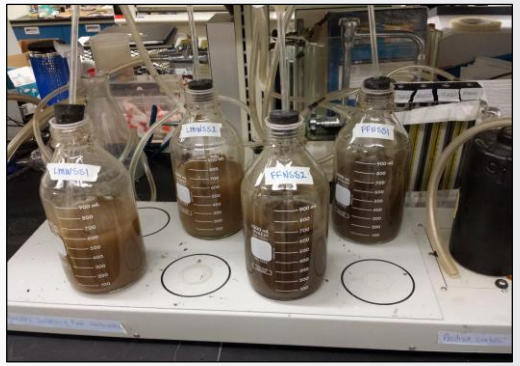
Region 3 PFAS State Engagement

July 25, 2018

Current Per- and Polyfluoroalkyl Substances (PFAS) Research and Development Activities

- **Analytical Methods**
- **Exposure**
- **Human Health/Toxicity**
- **Treatment/Remediation**
- **Technical Assistance**





Research: Analytical Methods

- **Problem**: Lack of standardized/validated analytical methods for measuring PFAS
- **Action**: Develop and validate analytical methods for detecting, quantifying PFAS in water, air, and solids
- **Results**:
  - Testing current drinking water method for 6 additional PFAS (20 total, including GenX)
  - Developing and testing method for 20 PFAS in surface water, ground water, and solids
  - Initial development of method for air emission sampling and analysis
  - Continued development of non-targeted methods to discover unknown PFAS
- **Impact**: Stakeholders will have reliable analytical methods to test for known and new PFAS in water, solids, and air

Research: Exposure

- **Problem**: Lack of knowledge on sources, site-specific concentrations, and exposure
- **Action**: Develop and test methods to characterize PFAS sources and exposures
- **Results**:
  - Developing exposure models for identifying, quantifying PFAS exposure pathways and relative source contribution
  - Developing and evaluating sampling and site characterization approaches to identify sources and extent of contamination.
- **Impact**: Stakeholders will be able to assess potential PFAS sources and exposures, and identify key exposure pathways for risk management

Research: Human Health/Toxicity

- **Problem**: Lack of toxicity values for many PFAS compounds
- **Action**:
  - Literature review of published toxicity data for 31 PFAS of interest
  - Conduct assessments, fill gaps through computational toxicology
- **Results**:
  - Literature review complete, ~21 PFAS with some in vivo data to support assessment
  - Toxicity assessment underway for GenX, PFBS
  - Computational assays underway for 75 PFAS representative of PFAS chemical space
- **Impact**: Stakeholders will have PFAS toxicity values to support risk management decisions and risk communication

Research: Drinking Water Treatment

- **Problem**: Lack of water treatment technology performance and cost data for PFAS removal
- **Action**:
  - Review PFAS performance data from available sources (industry, DoD, academia, international)
  - Test commercially available granular activated carbons (GACs) and ion exchange (IE) resins for effectiveness over a range of PFAS under different water quality conditions
  - Evaluate a range of system sizes – large full-scale utility options to home treatment systems
- **Results**:
  - Update EPA's **Drinking Water Treatability Database**, a public database for treatment performance data for regulated and unregulated contaminants
  - Use state-of-the-science models to extrapolate existing treatment studies to other conditions
- **Impact**: Utilities will be able to identify cost effective treatment strategies for removing PFAS from drinking water

Research: Contaminated Site Remediation

- **Problem**: PFAS-contaminated sites require remediation and clean up to protect human health and the environment
- **Action**:
  - Characterize sources of PFAS such as fire training and emergency response sites, manufacturing facilities, production facilities, disposal sites
  - Evaluate treatment technologies for remediating PFAS-impacted soils, waters, and sediments
  - Generate performance and cost data with collaborators (DOD, WRF, industry, etc.) to develop models and provide tools to determine optimal treatment choices
- **Results**: Tools, data and guidance regarding cost, efficacy, and implementation for remedy selection and performance monitoring
- **Impact**: Responsible officials will know how to reduce risk of PFAS exposure and effects at contaminated sites, and to repurpose sites for beneficial use

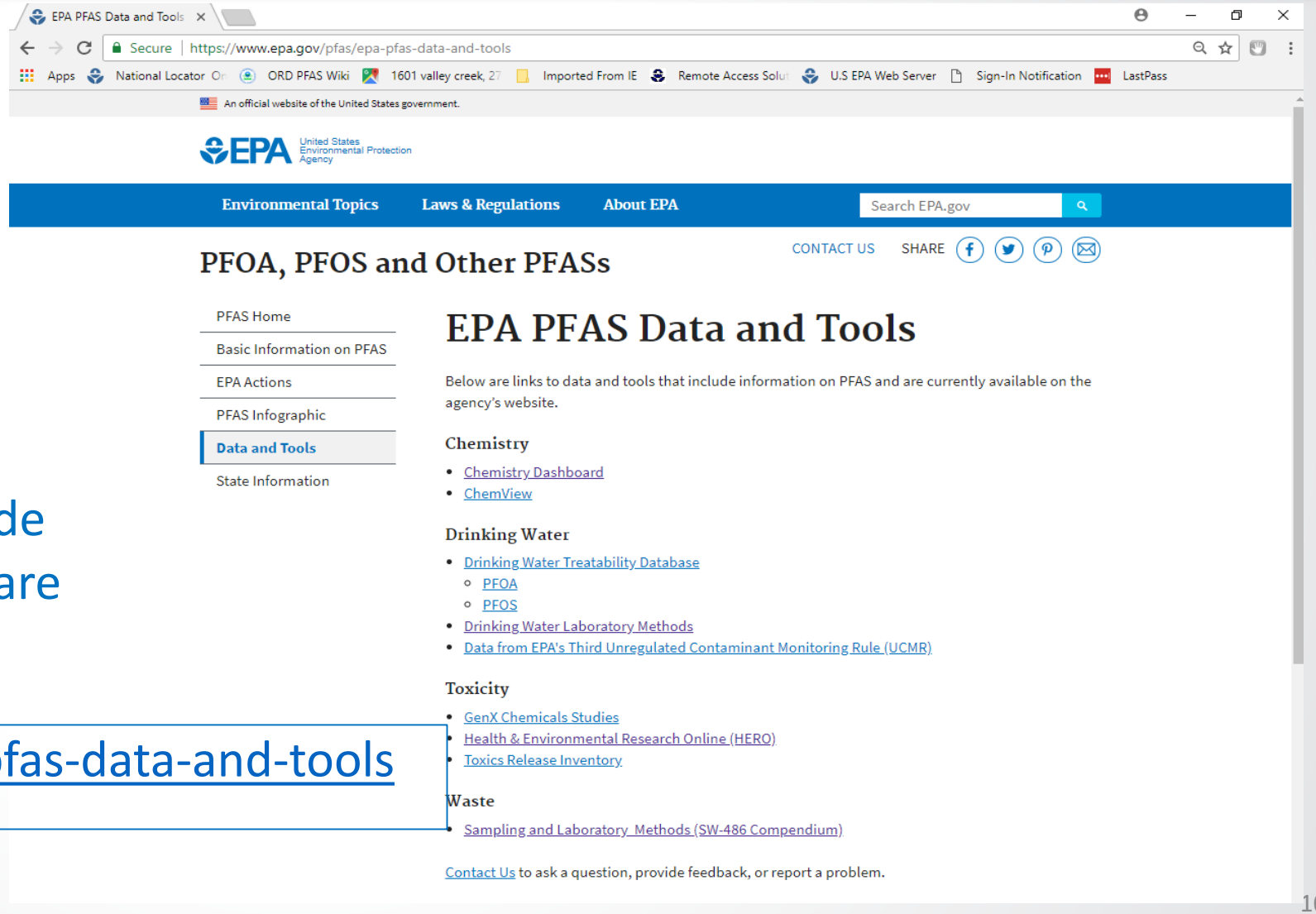
Research: Materials Management

- **Problem**: Lack of knowledge regarding end-of-life management (e.g. landfills, incineration) of PFAS-containing consumer and industrial products
- **Action:**
  - Characterize various end-of-life disposal streams (e.g. municipal, industrial, manufacturing, landfills, incinerators, recycled waste streams) contributing PFAS to the environment
  - Evaluate efficacy of current and advanced waste management technologies (e.g. landfilling, thermal treatment, composting, stabilization) to manage PFAS at end-of-life disposal
  - Evaluate performance and cost data with other entities (DOD, industry, academia, etc.) to manage these materials and manage PFAS releases to the environment
- **Results**: Provide technologies, data and tools to manage these end of use streams
- **Impact**: Responsible officials will be able to manage effectively end-of-life disposal of PFAS-containing products

Technical Assistance for States, Tribes and Communities

- **Problem**: State, tribes and communities sometimes lack full capabilities for managing PFAS risk
- **Action:**
  - Make EPA technical staff available to consult on PFAS issues
  - Utilize applied research at impacted sites to develop new research solutions while also providing technical support to site managers
  - Summarize reoccurring or common support requests to share lessons learned from technical support activities
- **Results**: Many examples of past and ongoing technical assistance
  - **Cape Fear River, NC** – Significant reductions in PFAS in source and finished drinking water
  - **Manchester, NH** – Collaboration on air and water sampling
  - **Newport, RI** – Review and support to DOD PFAS sampling at Naval Station Newport
- **Impact**: Enable states, tribes and communities to 'take action on PFAS'

EPA PFAS Data and Tools



Links to data and tools that include information related to PFAS and are available on EPA's website:

https://www.epa.gov/pfas/epa-pfas-data-and-tools

Addressing Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA)

Maureen Sullivan

Deputy Assistant Secretary of Defense
(Environment, Safety & Occupational Health)

PFAS Community Engagement in Horsham, PA
July 25, 2018

Drinking Water on Our Installations

- **Completed UCMR3 testing and reporting December 2015**
  - 63 DoD drinking water systems required testing
  - Only one system detected levels above the EPA PHA – Wright Patterson AFB had one sample at 235ppt
- **As a concerned consumer, in June 2016 ASD(EI&E) directed the Military Departments to test for PFOS/PFOA where DoD supplies drinking water**
  - Completed sampling and testing of all 524 DoD drinking water systems for PFOS/PFOA
- **DoD has identified 24 drinking water systems, where DoD is the water supplier, which tested above the LHA**
  - DoD is following the EPA advisory recommended actions to include taking wells off line and providing alternative drinking water
  - These actions break the exposure pathway
- **Where DoD is not the drinking water supplier, installations are encouraged to ask if their drinking water suppliers have tested the drinking water and are the results below the EPA LHAs**
  - Identified 12 systems where DoD is not the supplier that tested above the LHA level

Drinking Water off DoD Installations

- **The Components also sampled private drinking water wells if there was a suspected or known release that migrated off-base**
- **DoD is working with the Communities and private individuals to break the exposure pathway**
- **As part of the CERCLA process, DoD conducted off-base testing. As of August 2017:**
  - 2,445 off-base Public and Private drinking water systems tested
  - 564 public or private drinking water systems tested above the EPA LHA level
- **The information is available to the public at the following web link**

- **https://www.denix.osd.mil/derp/home/documents/pfos-pfoa-briefing-to-the-hasc/**

Groundwater Sampling

- **DoD follows a comprehensive approach to identify installations where DoD stored and/or used AFFF and suspect a release is impacting drinking water**
  - As of August 2017, DoD identified 401 active and BRAC installations in the United States with at least one area where there is a known or suspected release of PFOS/PFOA
- **DoD is following the CERCLA process to address these suspected releases [reference: Defense Environmental Restoration Program, 10 U.S.C. Section 2701]**
  - First step is to identify the source(s) of a known or suspected release
  - Then identify if there is an exposure through drinking water
  - If there is exposure, DoD priority is to cut off drinking water exposure
  - Once exposure pathway is broken, the site is prioritized and will follow the CERCLA process to fully investigate the release and determine the appropriate cleanup actions based on risk
- **The DoD Components are conducting additional investigations, which include sampling groundwater**

PFOS/PFOA Challenges

- **Cleanup standard -- Lifetime Health Advisory (LHA) vs Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) risk assessment**
- **Risk Communication**
- **We encourage EPA to consider going through the process to determine if establishment of a Maximum Contaminant Level (MCL), under the Safe Drinking Water Act, is appropriate**
- **Responding to state laws and standards**
- **PFAS exposure assessment and health study – Coordinating with ATSDR on how we will work together throughout the process**
- **PFOS/PFOA versus Perfluoroalkyl Substances (PFAS)**
- **Disposal of contaminated groundwater and used granulated activated carbon (GAC)**
- **Developing an effective version of Aqueous Film Foaming Film (AFFF) with no known adverse effects**
- **Insufficient time to program for requirements**

DoD remains committed to protecting human health and the environment

Conclusion

- **DoD's priority is to address PFOS/PFOA to protect personnel living and working on our installations and the surrounding communities that we have impacted**
- **Military Departments have made great strides to ensure safe drinking water for our installations**
- **We are addressing DoD's cleanup responsibility**
- **Initiated removal AFFF with PFOS from the supply chain**

References

Defense Environmental Restoration Program Authorities

- **Defense Environmental Restoration Program (10 U.S.C. Section 2701)**
  - Follow the CERCLA process and address hazardous substances, pollutants, and contaminants
- **DoD Follows the CERCLA Process**
  - Preliminary Assessment/Site Inspection – Identify releases
    - Use EPA's Regional Screening Levels to determine whether to continue to a Remedial Investigation
  - Remedial Investigation/Feasibility Study – Investigate and characterize the release and evaluate remedy alternatives
    - Perform Risk Assessment to determine if there is an unacceptable risk to human health or the environment
    - Evaluate ARARs – Once it is determined that remedial action is necessary, DoD will analyze state cleanup standards under the CERCLA ARARs process.
    - Develop Proposed Plan and Decision Document
  - Remedial Action/Remedial Operation
    - Implement and operate remedy
  - Long Term Management
    - Monitoring and Five Year Reviews
- **DoD prioritizes sites by risk level, but other factors may be considered**

Groundwater Sampling

Component	Total Installations with known or suspected release of PFOS/PFOA (as of August 31, 2017)	Number of Installations Sampled where results exceeded EPA LHA (as of August 31, 2017)	Total number of groundwater wells sampled	Number of groundwater wells that tested above the EPA LHA
Army	64	9	258	104
Navy/USMC	127	40	1,368	784
Air Force	203	39	1,022	719
DLA	7	2	20	14
Total	401	90	2,668	1,621

Applicable Policies

- **DoD Instruction 4715.06, "Environmental Compliance in the United States," May 4, 2015**
- **DoD Instruction 4715. 07, "Defense Environmental Restoration Program," May 21, 2013**
- **DoD Instruction 4715.18, "Emerging Contaminants (ECs)," June 11, 2009**
- **DoD Manual 4715.20, "Defense Environmental Restoration Program (DERP) Management," March 9, 2012**
- **ASD(EI&E) Memorandum, "Testing DoD Drinking Water for Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA)," June 10, 2016**
- **Emerging Contaminant Governance Council Meeting Results January 28, 2016**

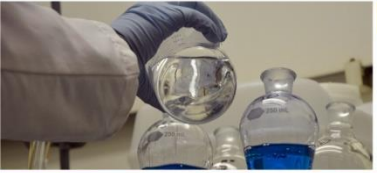
These are consistent with CERCLA, NCP, DERP Statute (10 U.S.C. 2701), and SDWA

Aqueous Film Forming Foam Replacement

- **ASD(EI&E) issued a policy in January 2016 requiring the Military Departments to:**
  - Issue Service-specific risk management procedures to prevent uncontrolled land-based Aqueous Film Forming Foam (AFFF) releases during maintenance, testing, and training activities
  - Remove and properly dispose of PFOS-based AFFF from the local supplies for non-shipboard use where practical
- **Each of the Military Departments is taking actions to remove the AFFF containing PFOS from the supply system**
  - AF funded removal of AFFF from all fire trucks and crash response vehicles in FY 2016
- **DLA is developing new stock numbers for PFOS-free foam**

PFOS/PFOA Initiatives

- **Conducted fate, transport, effects, and remediation research and demonstrations**
- **Held PFAS workshop in May 2017 (https://www.serdp-estcp.org/Featured-Initiatives/Per-and-Polyfluoroalkyl-Substances-PFASs/2017-Workshop-Report-on-Per-and-Polyfluoroalkyl-Substances)**
- **SERDP released two Statements of Need for FY 2018, and is initiating supplemental FY 2018 Statements of Need**
- **Participating on the Interstate Technology and Regulatory Council (ITRC) project to review and summarize the currently available Perfluoroalkyl Substances (PFAS) information**
  - ITRC technical team is comprised of members representing Federal and State regulators, Federal agencies, industry, and community stakeholders
  - The ITRC document will provide a unified summary of the state of the science to aid in the selection of appropriate responses to environmental releases of PFAS



pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PFAS Community Engagement Event State Panel Discussion

Pennsylvania Department of Environmental Protection

Horsham, Pennsylvania

July 25, 2018

Tom Wolf, Governor

Patrick McDonnell, Secretary

Opening Remarks

- We would like to thank EPA for the opportunity to participate on this panel discussion.
- We are concerned about per- and polyfluoroalkyl substances (PFAS) in our environment and in our drinking water.
  - The science on PFAS is still evolving.
  - PFAS may include as many as 3,500 - 4,500 unregulated compounds.
  - According to ECOS and AWWA, PFAS has been detected in at least 38 states across the country, including Pennsylvania.

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Opening Remarks

- There are more than 8,500 public water systems (PWS) in Pennsylvania that serve drinking water to 11.3 million people.
- It is estimated that an additional one million households rely on private wells for their drinking water. Pennsylvania is one of two states that does not regulate private wells.

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

State Actions to Address PFAS

Safe Drinking Water (SDW) Program Actions:

- Under the PA Safe Drinking Water Act (SDWA) and regulations, DEP has the authority to require corrective actions on a case-by-case basis for a PWS in which an unregulated contaminant presents a risk to public health.
  - DEP uses EPA's Health Advisory Levels (HAL) to determine risk to public health.
  - Corrective actions include monitoring, taking contaminated sources offline, issuing public notice, and installing long-term treatment.
  - While this authority is more stringent than many other states, it has its limitations, including the inability to require statewide monitoring, or address an unregulated contaminant for which an advisory level does not exist.

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

State Actions to Address PFAS

SDW Program Actions (cont.):

- The SDW Program has and will continue to coordinate our response with other state and federal agencies at PWSs where PFAS exceeds EPA's HAL.
- The program has and will continue to participate on several national workgroups (ASDWA, ECOS, etc.) to stay abreast of the ever-changing knowledge and science on PFAS.

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

State Actions to Address PFAS

SDW Program Actions (cont.):

- The SDW Program is developing a monitoring plan that will gather occurrence data from across the state, and provide a more complete picture of impacts from PFAS contamination. The plan will:
  - Prioritize PWS monitoring sites across the state based on land uses/activities associated with potential PFAS contamination, and available resources.
  - Include an action plan for PWS sites that exceed EPA's HAL.
  - Be posted to DEP's PFAS webpage, along with the monitoring results.

    PFAS webpage: www.dep.pa.gov/pfcs

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

State Actions to Address PFAS

Environmental Cleanup Program Actions:

- The state's Land Recycling and Environmental Remediation Standards Act establishes groundwater and soil cleanup standards for the release of regulated substances. PFAS would qualify as a regulated substance.
- The state's Hazardous Sites Cleanup Act (HSCA) gives DEP the authority to cleanup releases of hazardous contaminants. PFAS is a contaminant under HSCA.

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

State Actions to Address PFAS

Environmental Cleanup Program Actions (cont.):

- The Program is developing a new rule that would incorporate toxicity values and soil and groundwater medium-specific values (MSCs) for PFOS and PFOA into Chapter 250. These toxicity values and MSCs will be used by remediators to demonstrate the attainment of DEP's remediation standards for soil and groundwater.

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

State Actions to Address PFAS

Environmental Cleanup Program Actions (cont.):

- To date, DEP's Environmental Cleanup Program is aware of 11 sites contaminated with PFAS.
  - Easton Road PFC HSCA Site, Bucks County (state lead)
    - 320 private wells have been sampled; 8 are above the HAL
    - Seven monitoring wells were installed to track extent of contamination
    - DEP expects to begin the Administrative Record process in Fall 2018
  - Ridge Run PFC HSCA Site, Bucks County (state lead)
    - Two North Penn Water Authority wells are impacted
    - 156 private wells have been sampled; 12 are above the HAL
    - HSCA has prepared a Scope of Work for further investigation

Note: For state-led sites, the Program has/will provide private well owners with bottled water, GAC filters, and/or connection to public water.

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

State Actions to Address PFAS

Environmental Cleanup Program Actions (cont.):

- Sites contaminated with PFAS:
  - North Penn US Army Reserve Center (Nike PH 91 – Launch), Montgomery County
  - Former Naval Air Warfare Center - Warminster, Bucks County
  - Horsham Air National Guard Station (ANG), Montgomery County
  - Former NAS JRB Willow Grove - Horsham, Montgomery County
  - Nike PH 98/99 (Control), Bucks County

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

State Actions to Address PFAS

Environmental Cleanup Program Actions (cont.):

- Sites contaminated with PFAS:
  - Susquehanna Area Regional Airport Authority (HIA) Site, Dauphin County
  - Letterkenny Army Depot, Franklin County
  - Penn State Former Fire Training Site, Centre County
  - Valmont TCE Superfund Site, Luzerne County

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

State Actions to Address PFAS

For more information about PFAS and DEP actions, please visit our PFAS webpage at www.dep.pa.gov/pfcs

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DEP Recommendations

DEP supports the commitments that EPA made at the National PFAS Leadership Summit. However, we believe that additional actions are needed to protect public health.

DEP offers the following recommendations:

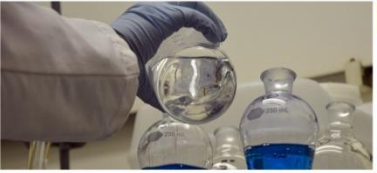
- EPA must take a leadership role and work with other federal agencies and states to address PFAS in a holistic manner. PFAS includes more than 3,500 compounds and states are dealing with more than just PFOA and PFOS. In addition, PFAS must be addressed through a comprehensive regulatory approach that includes all programs/media (drinking water, wastewater, soil, waste and air).

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DEP Recommendations

- EPA must address PFAS at the national level through the development of HALs and/or federal MCLs. States cannot do this work alone. Failure to address PFAS at the national level will continue to put public health at risk, lead to a patchwork of inconsistent state levels, and undermine the public's confidence in their drinking water.
- Congress must allocate additional funds beginning in FY 18/19 to ensure EPA and the states have the resources they need to address this public health challenge. Current budgets are already stretched thin as EPA and the states continue to implement the existing rules under the SDWA (including the control of microbial pathogens, disinfection byproducts and lead/copper), while responding to other non-regulatory drivers, such as post-Flint lead issues, *Legionella*, and harmful algal blooms. Additional funding is necessary in order to fully address the risks from PFAS.

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION



pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Lisa Daniels, Director
Bureau of Safe Drinking Water
717-787-9633
ldaniels@pa.gov

Community Engagement Forum

Pennsylvania Department of Health (DOH)

Sharon Watkins, PhD
State Epidemiologist
Director, Bureau of Epidemiology

Horsham, PA
July 25th, 2018

pennsylvania
DEPARTMENT OF HEALTH

DOH Actions on Per and Polyfluoro Alkyl Substances (PFAS)

2016

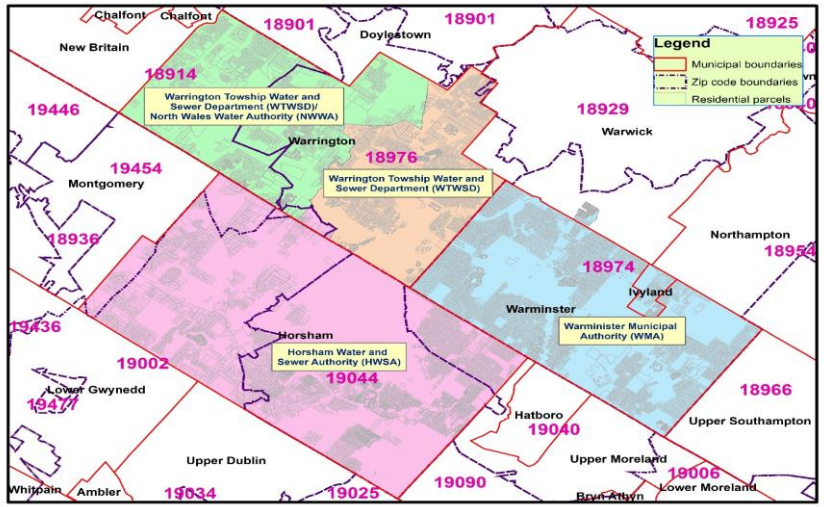
- DOH began attending Department of Defense's (DoD) Restoration Advisory Board (RAB) meetings to answer health-related questions on PFAS
- DOH participated in community meetings
- DOH participated in national scientific meetings on PFAS
- DOH participated in national & regional webinars & teleconferences
  - With the Council of State and Territorial Epidemiologists (CSTE), Centers for Disease Control and Prevention (CDC), Agency for Toxic Substances and Disease Registry (ATSDR)

pennsylvania
DEPARTMENT OF HEALTH

DOH Actions on PFAS

2016

- DOH worked with ATSDR to evaluate cancer incidence rates (1985-2013) in communities near military bases
  - Horsham
  - Warminster
  - Warrington



pennsylvania
DEPARTMENT OF HEALTH

DOH Actions on PFAS

2017

- DOH prepared two Addendums to the cancer study
  - Addendum 1- pancreatic and pediatric cancer rates
  - Addendum 2- restricted study to water service areas
    - drinking water as major environmental medium for exposure

pennsylvania
DEPARTMENT OF HEALTH

DOH Actions on PFAS

2017

- DOH Secretary Dr. Rachel Levine co-signed a letter to CDC calling for a nationwide study to determine the health outcomes in PFAS-affected communities, both industry and military related.
- DOH worked with ATSDR on development of the PFAS Exposure Assessment Technical Tools (PEATT) for PFAS biomonitoring and participated in the Toolkit document review process.

pennsylvania
DEPARTMENT OF HEALTH

PEATT Pilot Project

- DOH received funding from the Association of State and Territorial Health Officials (ASTHO) in early 2018 to evaluate the PEATT by implementing a pilot PFAS biomonitoring project and provide feedback.
- Approximately 500 residents from households near former military bases in Bucks and Montgomery counties will be selected for biomonitoring, based on PEATT protocol, which involves random sampling based upon address.
- DOH will communicate test results to the participants of the study along with materials to interpret and compare the results.

pennsylvania
DEPARTMENT OF HEALTH

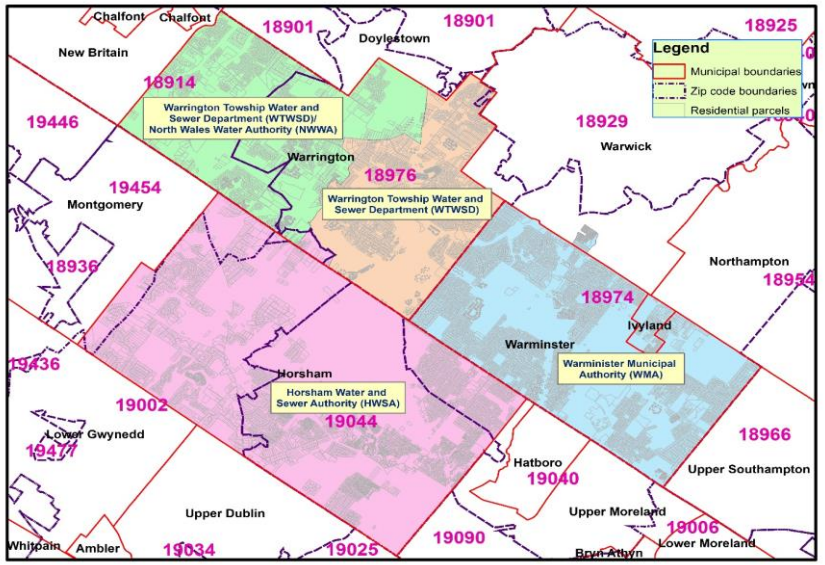
PEATT Pilot Project

- Residents who lived in the area prior to June 2016 are eligible.
- Participants' blood samples will be analyzed for eleven PFAS.
- Participants are required to provide written consent and information on demographics, length of residence in the area, exposure, occupation and health effects.
- DOH organized community meetings to explain the project and progress.

pennsylvania
DEPARTMENT OF HEALTH

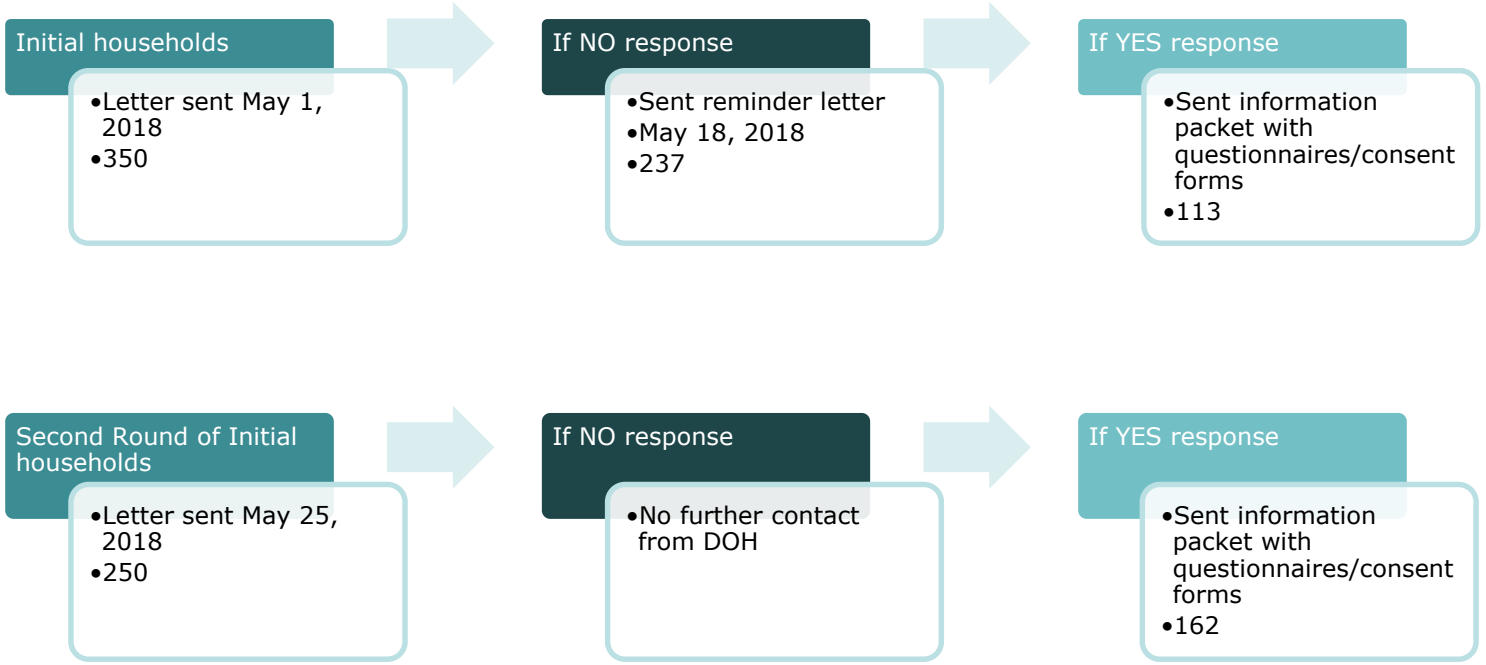
PEATT Pilot Project

- Affected area = population of 84,184 (2010 census)
- 32,595 households in water service area



pennsylvania
DEPARTMENT OF HEALTH

Flow Chart of Selection Process



275 households returned eligibility forms stating interest

600 potential participants

pennsylvania
DEPARTMENT OF HEALTH

Progress so far…

Participant Numbers as of July 17	
Total Number of Households Contacted	600
Households that Responded	275
Eligible and Interested Households	232
Eligible Participants	598 (481 adults 117 children)
Participants who've completed blood testing	125 (113 adults 12 children)

DOH expects to complete the project within the next six months.

pennsylvania
DEPARTMENT OF HEALTH

Recommendations

- DOH acknowledges that PFAS are a large family of compounds and there are complex and multiple exposure opportunities, requiring a holistic approach at the national level to ensure public health.
- Improved coordination among the Environmental Protection Agency (EPA), CDC/ATSDR and the Food and Drug Administration (FDA) to facilitate a common approach to assess PFAS exposure and public health impacts is needed.

pennsylvania
DEPARTMENT OF HEALTH

Recommendations

- More research is needed to understand the health impacts of the new generation of PFAS (newly developed and have replaced some of the old compounds).
- Studies are needed to understand the full spectrum of health effects, including chronic health effects and effects of simultaneous exposure to multiple PFAS.
- Health outcomes on vulnerable populations (elderly, pregnant women, immunocompromised, children) should be assessed.

pennsylvania
DEPARTMENT OF HEALTH

Recommendations

- Epidemiological research is needed to better link laboratory studies to real world exposure in humans.
- Studies are needed to determine chronic MRL for PFAS.
- Studies to assess health effects due to inhalation exposure are needed.
- Studies to assess PFAS exposure through indoor environment are needed. Eighty percent of PFAS exposure is via consumer products and contaminated indoor environment may pose a higher risk to elderly, infants and socially vulnerable populations.

pennsylvania
DEPARTMENT OF HEALTH

EPA Region III PFAS Community Engagement Session

Christopher Crockett, PE, Ph.D.
Aqua America Chief Environmental Officer

July 25, 2018

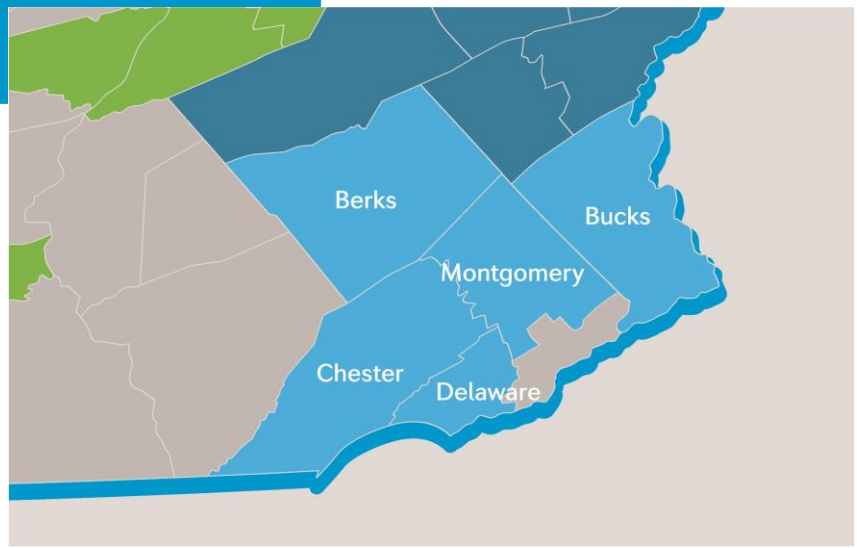
Aqua in Southeast PA

AQUA PENNSYLVANIA

SOUTHEAST

At A Glance

- 1.2 MILLION PEOPLE SERVED
- 4,500 MILES OF PIPE
- 10.6k WASTEWATER CONNECTIONS
- 100 MILLION GALLONS DAILY
- 112 MUNICIPALITIES
- 9 SURFACE WATER TREATMENT PLANTS
- 361k WATER CONNECTIONS
- 86 TANKS
- 77 DEEP WELLS



AQUA

Our Need for an EPA Regulation

Aqua Labs in Bryn Mawr

Instrument to detect PFAS

Actions We've Taken on PFAS

Treatment

GAC filter

Communication

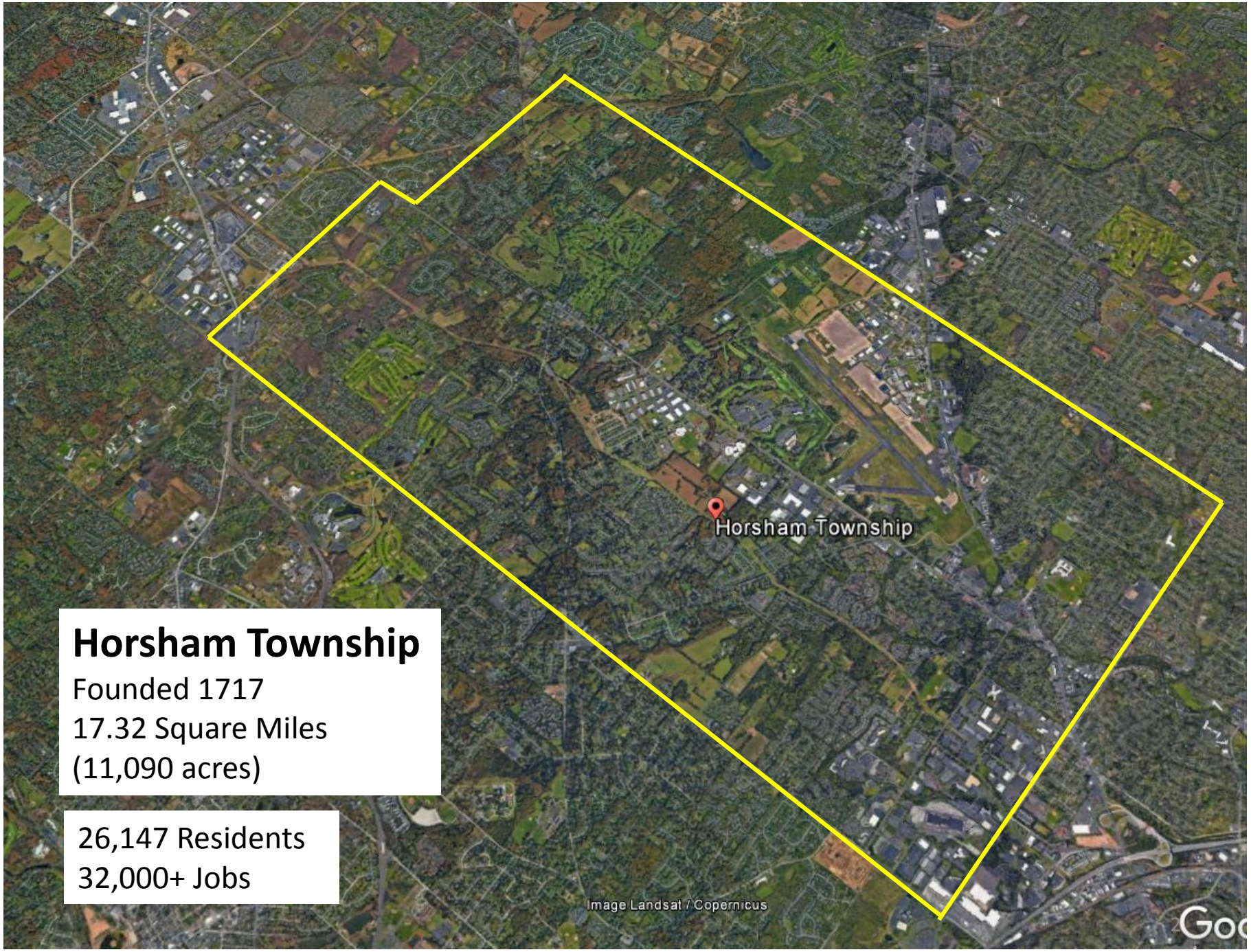
WaterFacts.com

AQUA SM

Aqua PFAS Plan Moving Forward

HORSHAM

Horsham Township
Horsham Water & Sewer Authority
Horsham Land Redevelopment Authority



Horsham Township

Founded 1717
17.32 Square Miles
(11,090 acres)

26,147 Residents
32,000+ Jobs

Since learning of the PFAS situation in 2014, Horsham Township Council has taken decisive actions to protect our community:

- With EPA's Provisional Health Advisory Levels (PFOS 200 ppt PFOA 400 ppt) Horsham Township immediately took steps to come into compliance.
- EPA issued Lifetime Health Advisory Levels (70 ppt combined) in May 2016, causing Horsham Township to establish new objectives.
- A Short Term Remediation Plan was established in June 2016 to address the new EPA standards.
- Retained a public awareness firm to assist in our communications effort
- Retained an internationally recognized consultant to provide technical expertise
- Established a Long Term Remediation Plan in September 2016

All of these efforts have been accomplished at significant cost to Horsham Township citizens. Currently the Township's out of pocket expenses are approaching $1M. Even more importantly, the stigma of the contamination has potentially impacted local real estate values and employment opportunities.

Horsham Township's Plan has four distinct components:

- Education
- Communication
- Remediation
- Compensation

Horsham has been able to accomplish these efforts through:

- Funding from cooperative agreements with the U.S. Navy and National Guard Bureau
- Funding from a PENNVEST grant
- An on-going surcharge paid by HWSA rate payers
- Township Funds

Horsham Water and Sewer Authority actions have included:

- Removed impacted wells from service
- Increased purchases of water from other sources
- Installed temporary GAC filters on three wells and permanent filters on two other wells; also using resin in the treatment process
- Installed 1.8 miles of new water mains to make public water available to more homes
- Installed additional interconnect with neighboring water supplier
- Currently installing permanent filters to replace the temporary filters the three wells and new filters on five additional wells
- Currently installing permanent filter on Aqua interconnect

Currently HWSA continues to
achieve more stringent water quality standards
than those set by EPA and DEP.

EPA's Lifetime HAL (70 ppt) is approximately
17 times greater than HWSA's current
system-wide average (4 ppt combined)

This average is calculated
by a mass calculation formula.

Annual cost is ~ $1.2 Million and is being funded by Horsham ratepayers

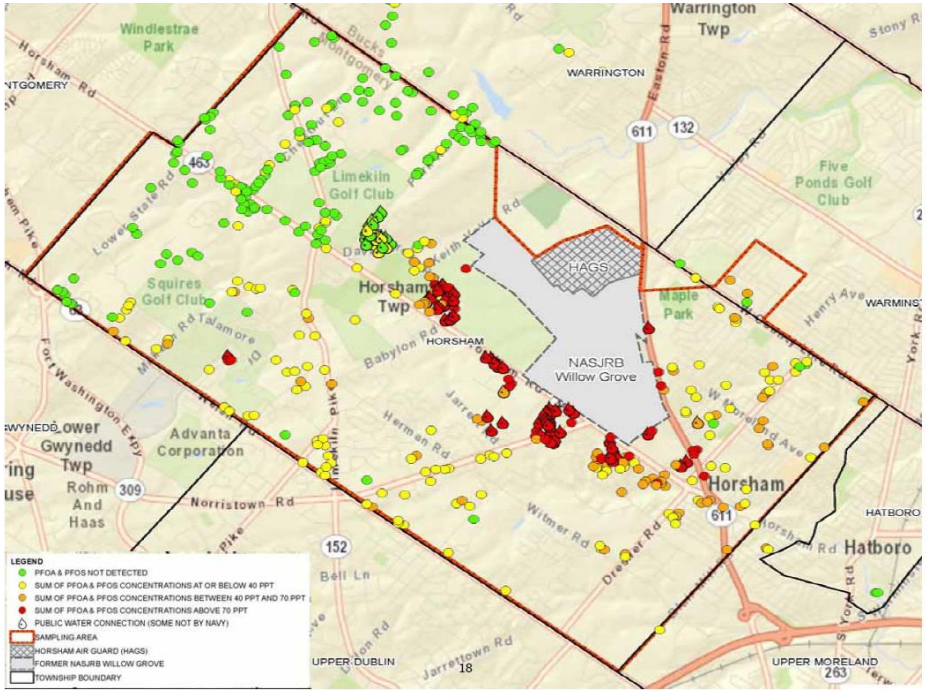
Challenges

- Installing GAC treatment of wells, particularly those with either small land footprints and/or in residential neighborhoods can be difficult and extremely unpopular with neighboring property owners.

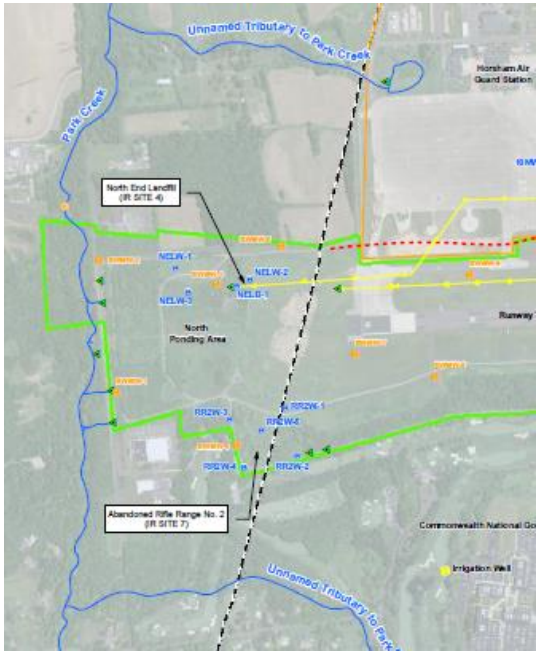
Challenges (con’t)

- Capital and O&M (carbon change-outs) costs are expensive.
- Carbon change-outs can result in wells out of service for days.
- GAC treatment on wells is a substantial change in operational complexity and knowledge – these are transformative changes for small/medium groundwater systems
- Permitting of alternative treatment, such as resin, is proving to be difficult, which is somewhat ironic considering PFAS is not regulated!

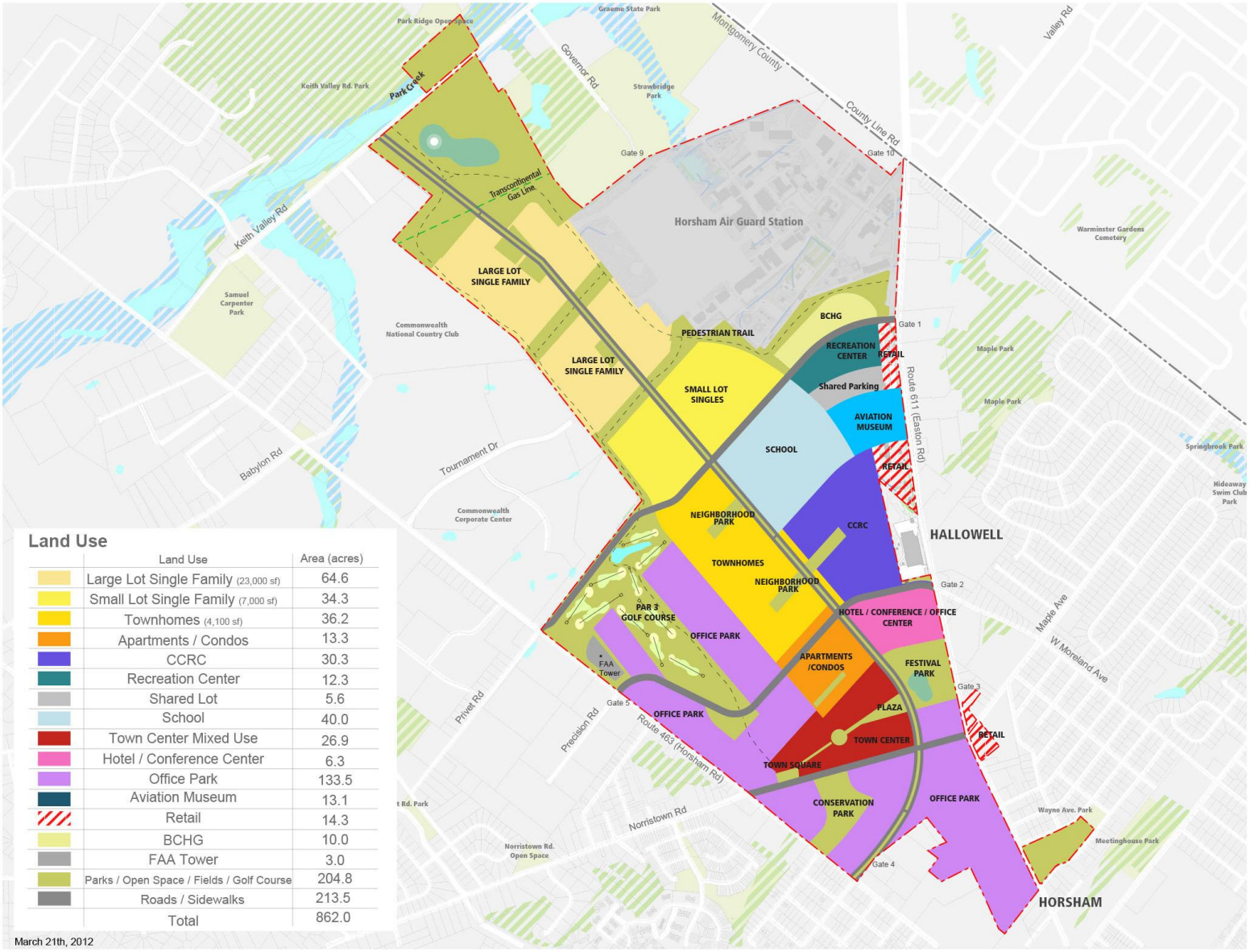
- Over 450 properties have private wells
- 101 tested above EPA LHAL level (70 ppt)
- 88 properties connected to public water system (others pending)
- 78 properties tested between 40 and 70 ppt



- Stormwater leaving the former Naval Air Station –Joint Reserve Base Willow Grove and the Horsham Air Guard Station has PFOA/PFOS levels above the EPA LHAL
- Much of the stormwater enters Park Creek which likely impacts down stream drinking water sources in other communities



APPROVED REDEVELOPMENT PLAN



Land Use

Land Use	Area (acres)
Large Lot Single Family (23,000 sf)	64.6
Small Lot Single Family (7,000 sf)	34.3
Townhomes (4,100 sf)	36.2
Apartments / Condos	13.3
CCRC	30.3
Recreation Center	12.3
Shared Lot	5.6
School	40.0
Town Center Mixed Use	26.9
Hotel / Conference Center	6.3
Office Park	133.5
Aviation Museum	13.1
Retail	14.3
BCHG	10.0
FAA Tower	3.0
Parks / Open Space / Fields / Golf Course	204.8
Roads / Sidewalks	213.5
Total	862.0

March 21th, 2012

Option F
Final Preferred Land Use Plan

NAS - JRB Willow Grove Base Redvelopment Plan
Horsham Township, PA

Legend
- Willow Grove NAS
- Municipal Boundary
- Parcel
- Parks and Open Space
- Horsham Air Guard Station
- Transcontinental Gas Line
- NWI Wetlands
- FEMA Flood Plain
- Vegetation
- Habitat Areas

Sources
NAS GIS data from Weston Solutions Inc. (received from Tetra Tech), Google and Bing Maps. Surrounding context data from DVRPC.

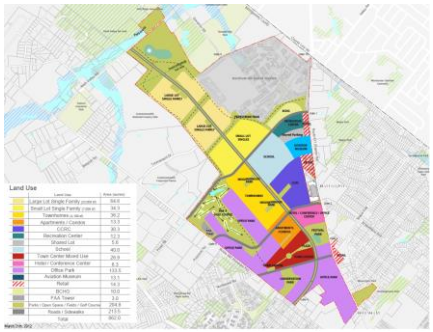
0 300' 600' 1,200' 1,800' 2,400'

HLRA
Horsham Land Redevelopment Authority

- Redevelopment of the former Naval Air Station –Joint Reserve Base Willow Grove base has been delayed
  - NAS-JRB Willow Grove closed in March 2011
  - Scheduled transfer in September 2011 did not occur
  - Former base continues to be vacant and leaves an economic void created by the base closure

- Potential impacts of PFAS contamination on the Redevelopment Plan are currently unknown and may include deed restrictions and land use controls

- The ability to establish property values and the feasibility of the Redevelopment Plan may need to be re-evaluated



Concerns:

- Lack of standards for soil, surface water and sediment puts HLRA at risk if future standards require remedial actions on property already developed

- Current focus on drinking water does not address the problem (PFAS in soils continue to leach into the groundwater and contaminate the aquifer which is Horsham Township's drinking water source).

Recommendations/Needs

- The impacts of the past exposure cannot be ignored – more extensive epidemiology testing for the community is needed to include former military members assigned to the base
- Risk communication strategies to address public concerns concerning past exposures and regulatory inconsistencies are needed
- As the source of the PFAS contamination is known, the citizens of Horsham should not bear any of the costs for removing PFAS from their drinking water

Recommendations/Needs

- The raw water in the aquifer remains contaminated and will be for a long time – HWSA treating the water at their own wells should not be the long-term remediation method for the aquifer
- Sources of PFAS remain at the base in the water & the soil and must be mitigated
- HWSA, other PFAS impacted utilities, and state primacy agencies need guidance in determining the best available technologies for PFAS treatment and appropriate permitting strategies

Recommendations:

- PFOS and PFOA should be listed as CERCLA hazardous substances

- Government should retain liability for all PFAS contamination resulting from past use or spills on military property.

- Government standards should be consistent (resolve differences between different agencies (i.e. EPA, ATSDR)

- EPA should require the former NAS-JRB Willow Grove and the Horsham Air Guard Station (HAGS) to have one remedial plan and the same expedited schedule.

- Given the financial impact to the Township and its residents, the federal government should transfer ownership of property at no cost, once the remediation plan has been implemented.

- Horsham continues to be a great place to live, work and play.
- Thanks to the expedited efforts of the Horsham Township community, our drinking water continues to be high quality and safe
- Horsham will be a leader in redeveloping property impacted by PFAS contamination
- But we need EPA's assistance in promptly establishing standards

Thank you for coming to Horsham Township

A special thanks to EPA Region 3 and PADEP (Southeast Regional Office) for their guidance and support

Horsham Township
Horsham Water & Sewer Authority
Horsham Land Redevelopment Authority

Warminster Township Municipal Authority

- Exceeding Standards
- Maintaining/Rebuilding Customer Trust
- 90% Purchased Water Supply from Forest Park Water
- 3 Public Wells with PFAS Treatment Systems Installed

Warminster Township Municipal Authority

- How can EPA Help?
- Communicate Lab Standards for UCMR Testing
- Define PFAS as CERCLA Hazardous Substances
- Funding! Funding! Funding!

Warrington Township

PFAS Community Presentation

July 25, 2018

Warrington Township PFAS Response

- October 2014- Public wells tested in conjunction with EPA UCMR 3 requirement

- Wells 1, 2, and 6 taken offline 10/29/14 due to exceedance of EPA Provisional Health Advisory Level [600ppt PFOS/PFOA combined]

    - Supplementary water purchased from North Wales Water Authority (NWWA) to replace lost production (600 gpm) – increased cost, as compared to use of own wells

Warrington Township PFAS Response

- Granular Activated Carbon treatment of Wells 1,2,& 6, now installed

- October 2015- Township entered into Cooperative Agreement (CA) with Air National Guard (ANG) for installation of remedial measures ($5.9 Million)

- May 19, 2016- EPA released new combined Health Advisory Level (HAL) [70ppt PFOA/PFOS combined]
  - Wells 3 and 9 taken offline
  - Supplementary water purchased from NWWA (440 gpm)
  - Treatment will be installed on these two wells

Warrington Township PFAS Response

- December 2016- Warrington Township enters into 10 year contract with NWWA, 1.6 Million gallon per day (MGD) minimum purchase requirement/2.0 MGD maximum purchase allotment – increased cost, as compared to use of own wells

- Constructed two (2) additional interconnections to improve distribution and reliability of NWWA supply

- **August 2017- 100% transition to NWWA water**

Warrington Township PFAS Response

- Connected 26 homes with contaminated private wells to public water, sealed wells
- Installed water main extensions to provide public water service to contaminated areas
- October 2017- Amendment to the CA increasing funding to $13.5 million provided from ANG

Warrington Township PFAS Response

- Funding still only addresses wells above the HAL of 70ppt for PFOA and PFOS combined – **Township is committed to providing water at non-detect level of PFAS to all users**

- January 2018- $5.17 per thousand gallons water rated adopted in conjunction with 2018 Budget – increase based on additional cost of purchased water

- May 2018- Warrington Township joined Horsham and Warminster in Anapol Weiss lawsuit against 3M (manufacturer of chemicals)

Community Panel

EPA Region 3 Community Engagement Meeting

Wednesday July 25, 2018

Presenters:

Joanne Stanton, Hope Grosse, and Mark Cuker

Community Story

Topics of Discussion

- Challenges & Concerns
- Recommendations for PFAS Management Plan

National PFAS Contamination Coalition

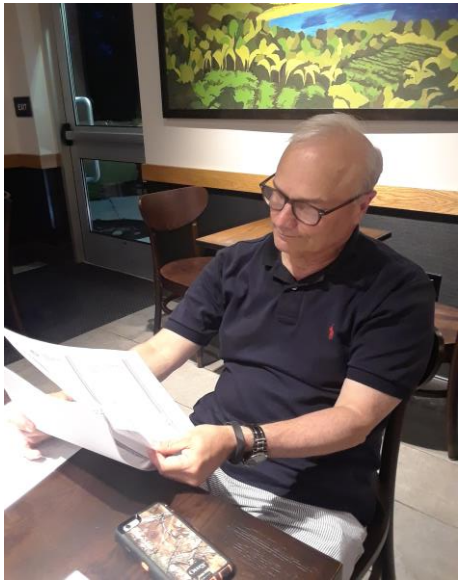
SSEHRI Northeastern University Social Science Environmental Health Research Institute

TOXICS ACTION CENTER

BUXMONT COALITION FOR SAFER WATER

SILENT SPRING INSTITUTE
Researching the Environment and Women's Health

TESTING *for* PEASE



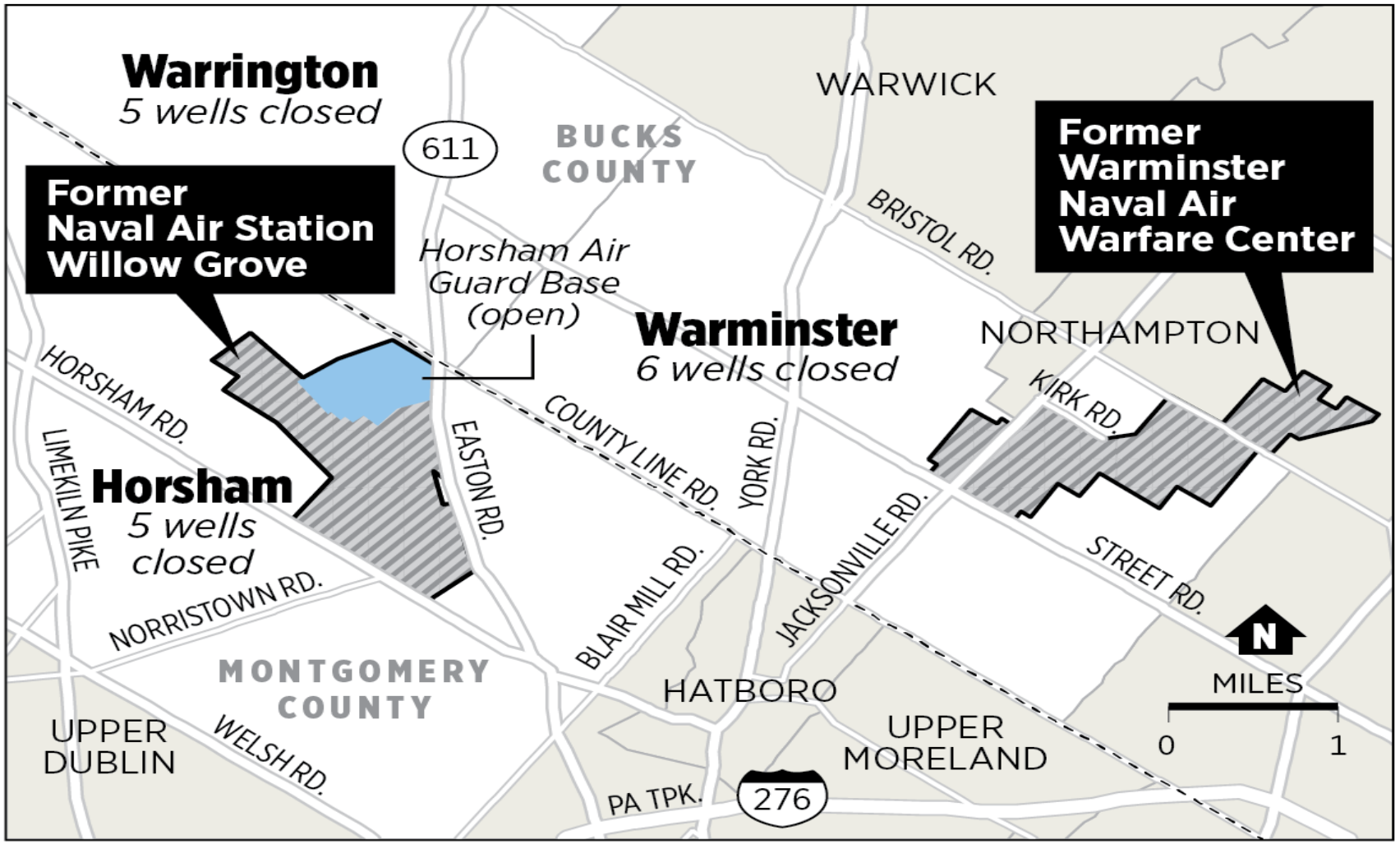
Goal: To set protection levels for all chemicals in the class of per- and polyfluoroalkyl substances (PFAS)

- State drinking water standards
- Federal enforceable standards (MCLs)

A Closer Look at Our Levels

- Warminster's highest public water **PFOA** level was 350 ppt
- Warminster has **3rd highest** public water **PFOS** level in the U.S. (1,100 ppt)
- Willow Grove site **on-base** water supply well tested **PFOS** at more than 240 times the EPAs limit (19,000 ppt)
- Willow Grove site ground water samples in 2017 showed **total PFAS** at **4,285 times** the EPA limit (up to **300,000 ppt**)
- The area has recorded among highest public **drinking water** level for **PFOA/PFOS combined** (1,290 ppt)
- All 3 area water utilities are among the top 10 utilities with the highest **PFHxS/PFOS** combined levels sampled in the U.S.

Community Concerns & Challenges:
Affected Communities Continue to Expand



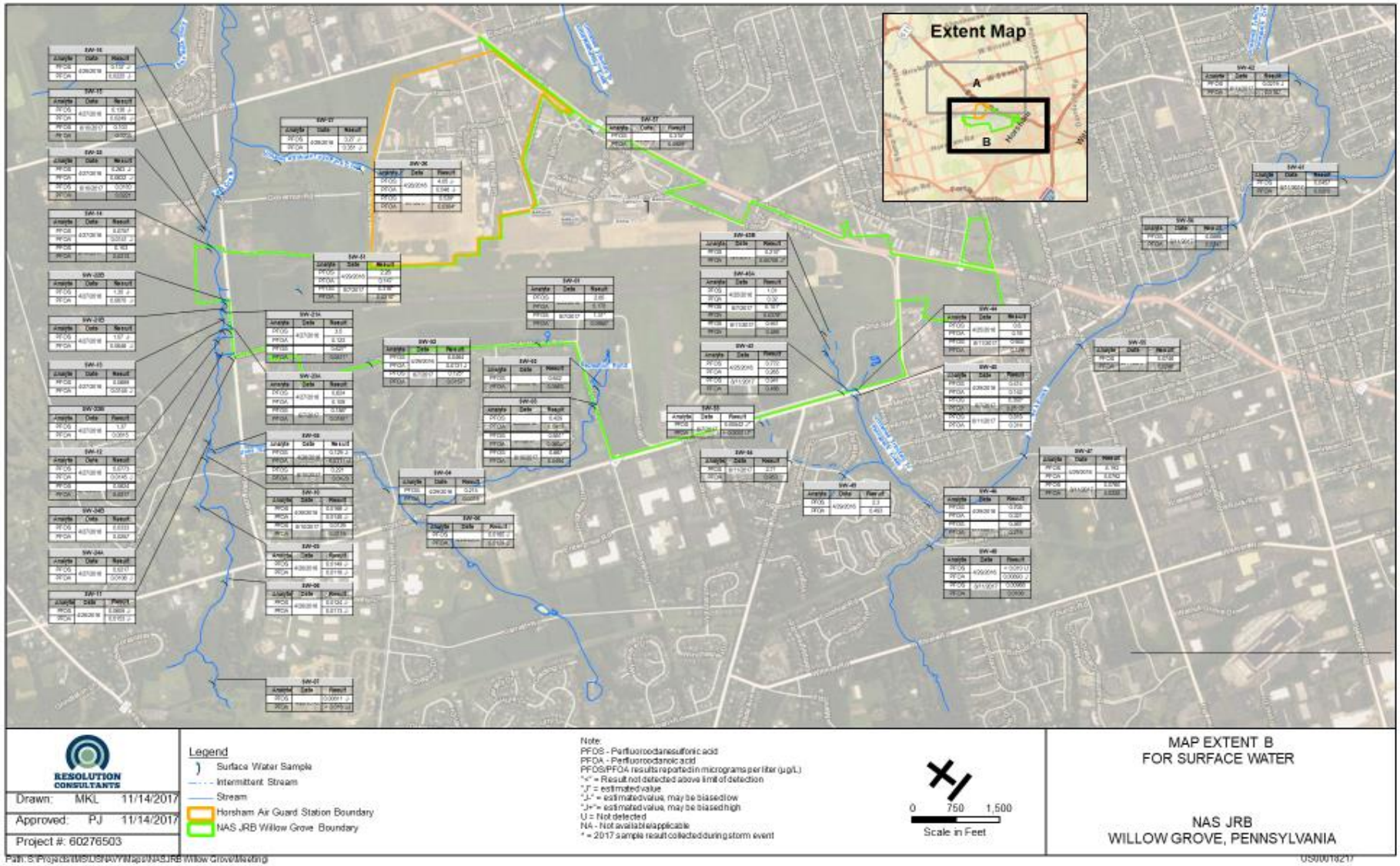
Staff Graphic

Community Concerns & Challenges:
Spread of Contaminants

- Uncontrolled off-site discharges have allowed contaminants to migrate into the community for decades unabated

Graeme Park (2006)

Willow Grove NAS JRB Surface Water



Community Concerns & Challenges: Our Differences

- Over **100,000** local residents impacted
- Two DOD NPL Superfund Sites
- Decades long PFAS exposure
- Lack of science on how PFAS **combines** with other contaminants
- Fractured bedrock and plumes
- Off-site migration of contaminants
- Remediation outlook is bleak

Community Concerns & Challenges:
Inconsistent State and Federal Responses

Our Community

- No blood testing/monitoring
  (*Limited to PA Dept of Health pilot study*)
- No federal response for private/public wells < 70 ppt
- Little if any remediation
- No enforceable state or federal regulations

Other Communities/States

- Filtration, blood testing, remediation, biomonitoring
- Other states are continually issuing more protective limits
- **VT**: HAL set at 20 ppt for combined exposure to PFOS, PFOA, PFHxS, PFHpA, PFNA
- **NJ:** enforceable limits for PFOA (14 ppt), PFOS/PFNA (13ppt)

CDC ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Community Concerns & Challenges:
Lack of Enforceable Regulations

- Current LHAs for PFOS & PFOA are set too high and not protective enough
- Lack of federal health advisories for **all** PFAS
- Thousands of PFAS “presumed” safe potentially contaminating drinking water
- Private well owners with contamination <70 ppt also need protection

Community Concerns & Challenges: Health

- Wide range of health outcomes across various body systems associated with PFAS exposure
- Limited labs capable of testing water and blood
- Testing is not easily accessible, it is time consuming, and expensive
- PA DOH Cancer Review Data

Photo: Courtesy of *The Intelligencer*

Our Children's Health

Community Concerns & Challenges:
Protection of Our Children's Health

Certain PFAS:

- ✓ Cross the placenta & have been detected in human breast milk
- ✓ Affect growth, learning, and behavior in infants and older children
- ✓ Associated with dyslipidemia, renal function, and early puberty in children

Prenatal exposure to PFOA/PFOS associated with:

- ✓ Immune-related problems, such as asthma and reduced vaccine effectiveness, in early childhood.

Community Concerns & Challenges: Communication

- Communities deserve a seat at the table for critical decisions
- Inconsistent messages from government agencies
- Government agencies tend to downplay risks
- Full disclosure of all PFAS test results not just PFOA and PFOS

Community Concerns & Challenges: Lack of Transparency = Lack of Trust

- UCMR Testing was inadequate compared to EPA Method 537
- ATSDR report withheld
- RAB and other meeting notices posted late
- Adjacent landowners not directly notified of migrated contamination

Graeme Park (2006)

Working together

Members of NADC's crash crew learn to work together in realistic training exercises like this one.

Warminster NADC *Reflector* Newsletter

Community Concerns & Challenges: Financial

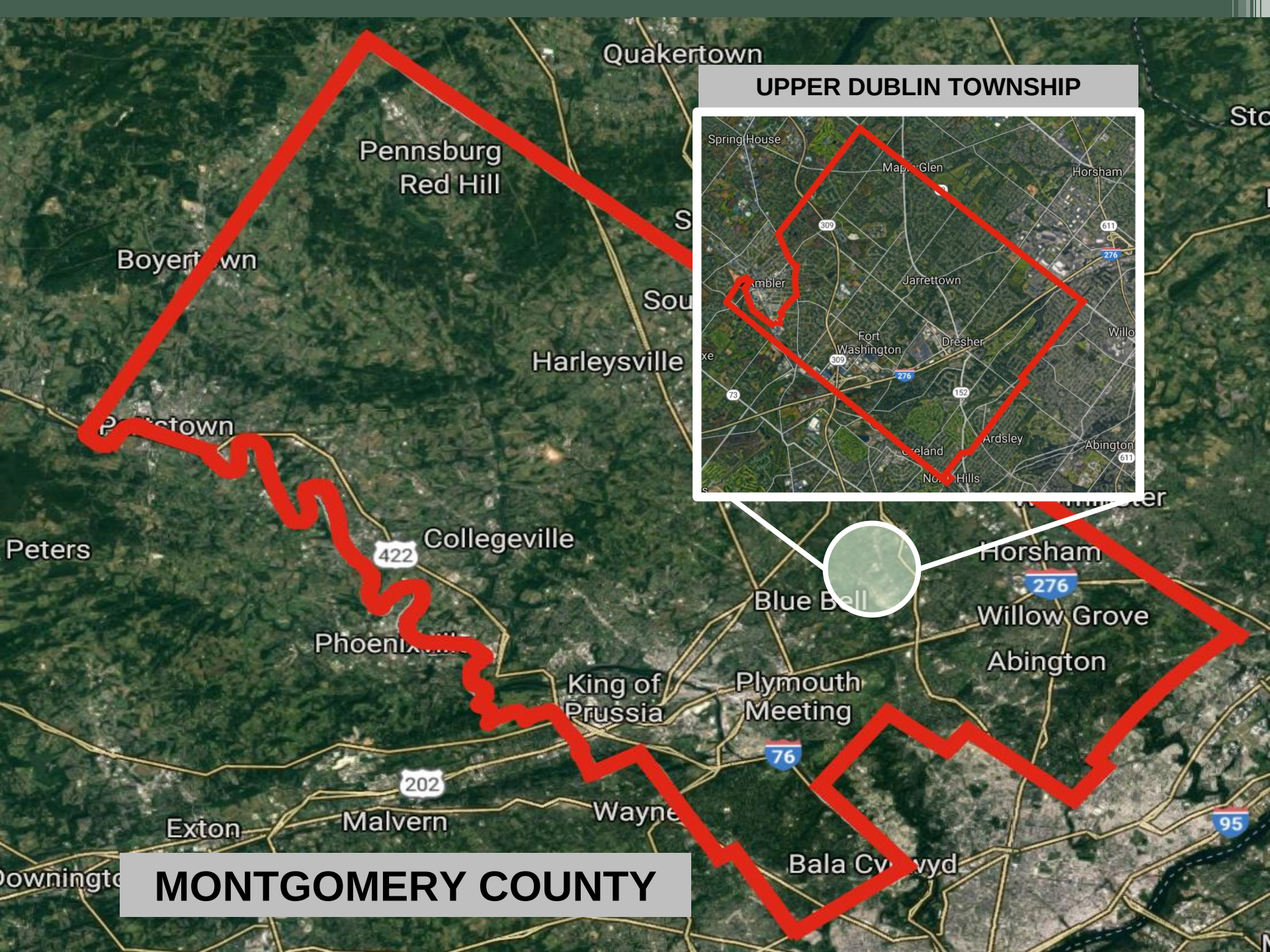
- Communities should not be responsible for the cost of clean water, blood testing or biomonitoring: MAKE POLLUTERS PAY
- Concerned residents are burdened with cost of bottle water, home filtration systems, and blood testing
- Cost of chronic illness
- Property values decreased

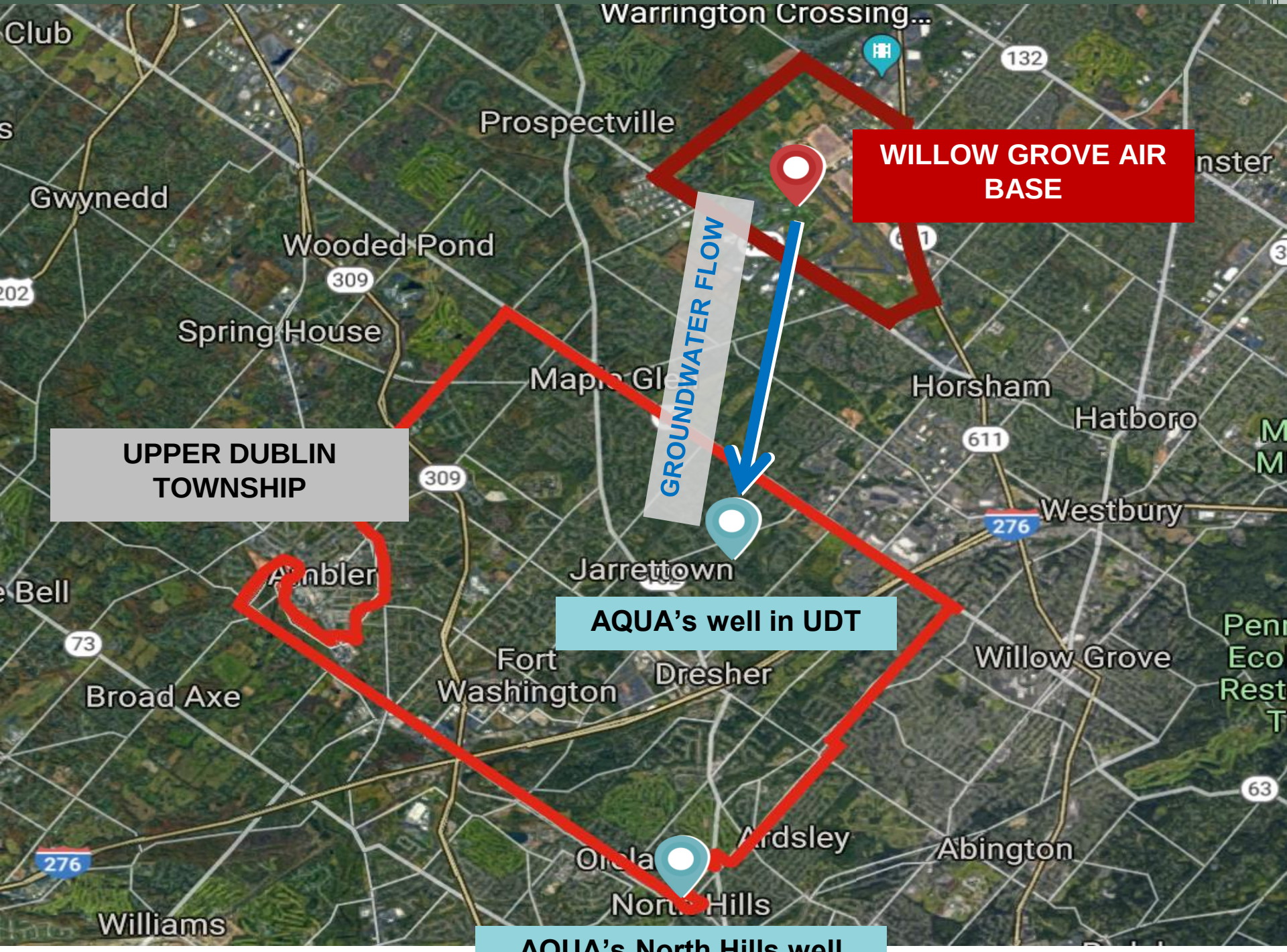
A Financial Glimpse

Concerns & Challenges: Overlooked local Communities

Upper Dublin Township

Aqua Well in the Township
Impacted by PFOA and PFOS


UPPER DUBLIN TOWNSHIP
Quakertown
Pennsburg
Red Hill
Boyertown
Harleysville
Collegeville
Peters
Phoenixville
King of Prussia
Plymouth Meeting
Blue Bell
Horsham
Willow Grove
Abington
Exton
Malvern
Wayne
Bala Cynwyd
Spring House
Jarrettown
Fort Washington
Dresher
Ardsley
Abington
Hills
422
309
276
611
73
152
76
202
95
MONTGOMERY COUNTY


WILLOW GROVE AIR BASE
GROUNDWATER FLOW
UPPER DUBLIN TOWNSHIP
AQUA's well in UDT
AQUA's North Hills well
Warrington Crossing...
Prospectville
Gwynedd
Wooded Pond
Spring House
Horsham
Hatboro
Westbury
Jarrettown
Fort Washington
Dresher
Willow Grove
Broad Axe
Abington
Ardsley
Williams
132
309
611
276
73
63

PFOA/PFOS Results for the Upper Dublin Township Well

AQUA - Monthly Averages, April 2016-February 2018

Key:

At least one sample exceeded Vermont's standard of 20 ppt for 5 PFAS chemicals (PFOA, PFOS, PFHxS, PFHpA, PFNA) combined

At least one sample exceeded both Vermont's standard and New Jersey's standard of 14 ppt for PFOA and 13 ppt for PFOS

	PFOS/PFOA (PPT)		PFOS/PFOA (PPT)
4/2016	18.4	6/2017	**34**
9/2016	**33**	7/2017	**21.7**
10/2016	**27.5**	8/2017	**31.5**
11/2016	**23**	9/2017	**33.5**
12/2016	**20.5**	10/2017	**28**
1/2017	**25.2**	11/2017	**32**
2/2017	**31.1**	12/2017	**32.5**
3/2017	**27**	1/2018	**28.5**
4/2017	**35**	2/2018	**32**
5/2017	**30**		

PFOA/PFOS Results for the North Hills Well

AQUA – Monthly Averages, August 2016-May 2018

Key:

At least one sample exceeded BOTH Vermont's standard of 20 ppt for 5 PFAS chemicals (PFOA, PFOS, PFHxS, PFHpA, PFNA) combined AND New Jersey's standard of 14 ppt for PFOA and 13 ppt for PFOS

	PFOS/PFOA (PPT)		PFOS/PFOA (PPT)
8/2016	**37.7**	7/2017	**52.4**
9/2016	**33.2**	8/2017	**49.4**
10/2016		9/2017	**45.5**
11/2016	**28.2**	10/2017	**41.1**
12/2016	**21**	11/2017	**39.7**
1/2017	**35.6**	12/2017	**40**
2/2017	**50.4**	1/2018	**43.8**
3/2017	**30.4**	2/2018	**41**
4/2017	**57.1**	3/2018	**43.4**
5/2017	**45.7**	4/2018	**45.1**
6/2017	**47.8**	5/2018	**39.15**

Upper Dublin Township Actions

- 2016 public meeting with Aqua
- Links to updated testing results and press releases on the Township website
- Paid for testing
- Resolution passed at the July 2018 Stated Meeting of the Board of Commissioners in support of House Bill 705
- Direction by the Board of Commissioner at the July 2018 Stated Meeting to request Aqua to bring Township blended water and the Aidenn Lair Well into compliance with new proposed standards

Community Recommendations for EPA

- Establish MCL that is the most protective of our children and other vulnerable populations for **all** PFAS
- MRLs in ATSDR report are 7 to 10x more protective than EPAs (PFOS 7 and PFOA 10.5)
- Classify PFAS as hazardous substances
- Treat PFAS as a class and regulate them together and **not** one compound at a time
- Agencies need to evaluate vulnerable water systems not subject to UCMR

Community Recommendations for EPA

- Eaton/Eurofin labs—methods now exist to test for multiple PFAS in water at lower levels than is currently being done now
- Be honest and fully transparent in all the action steps taken to address PFAS contamination
- Use the precautionary principal; resolve all doubts in favor of human health and safety


Photo: Courtesy of *The Intelligencer*

Unregulated Contaminants = Continued Exposure

Community Final Thoughts

Closing Remarks

“Nothing about us without us”