

📍 **MUNICIPAL CASE STUDY**

**Warrington Township, Pennsylvania**

*Warrington Township’s drinking water aquifers were contaminated by perfluorinated compounds (PFCs) from the use of fire-fighting foam for practice exercises at the Willow Grove Naval Air Station. These contamination issues have elevated water quality to the highest priority for the township. The township has a cooperative agreement with the Air National Guard to treat water with a granular activated carbon filtration system and is currently supplying township residents with water from the North Wales Water Authority (NWWA).*



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**Background**

Warrington Township is a predominantly suburban community with a thriving commercial district, many parks and amenities, and a high standard of living. Little of the township’s past industry remains. The “Gateway to Bucks County since 1734” is 13.8 square miles with a 2015 population of 23,942 (approximately 1,735 persons per square mile). Approximately 95 percent of the township is on public water and sewer, and the township’s Water and Sewer Department serves approximately 25,000 people.

The township falls within the Delaware River Basin, and its relatively modest topography (a high elevation of 468 feet) drains into the Neshaminy and Little Neshaminy creeks. The Neshaminy Creek drains the northern half of the township and contains the Mill Creek subwatershed. The Neshaminy, excluding the Little Neshaminy, has a watershed area of approximately 189 square miles and measures 24.7 linear miles. The Little Neshaminy Creek and its subwatershed, Park Creek, drain the south side of Warrington. The Little Neshaminy drains approximately 43 square miles and measures 16 linear miles. The Bradford Dam subbasin formed by the Bradford flood control dam lies within the Little Neshaminy Watershed. The Bradford Dam (PA 611) was constructed in 1976 and holds 2,156 acre-feet of water. It drains an area of 10.9 square miles. The dam provides flood control for downstream properties.

**Quick Stats**  
*Warrington Township*

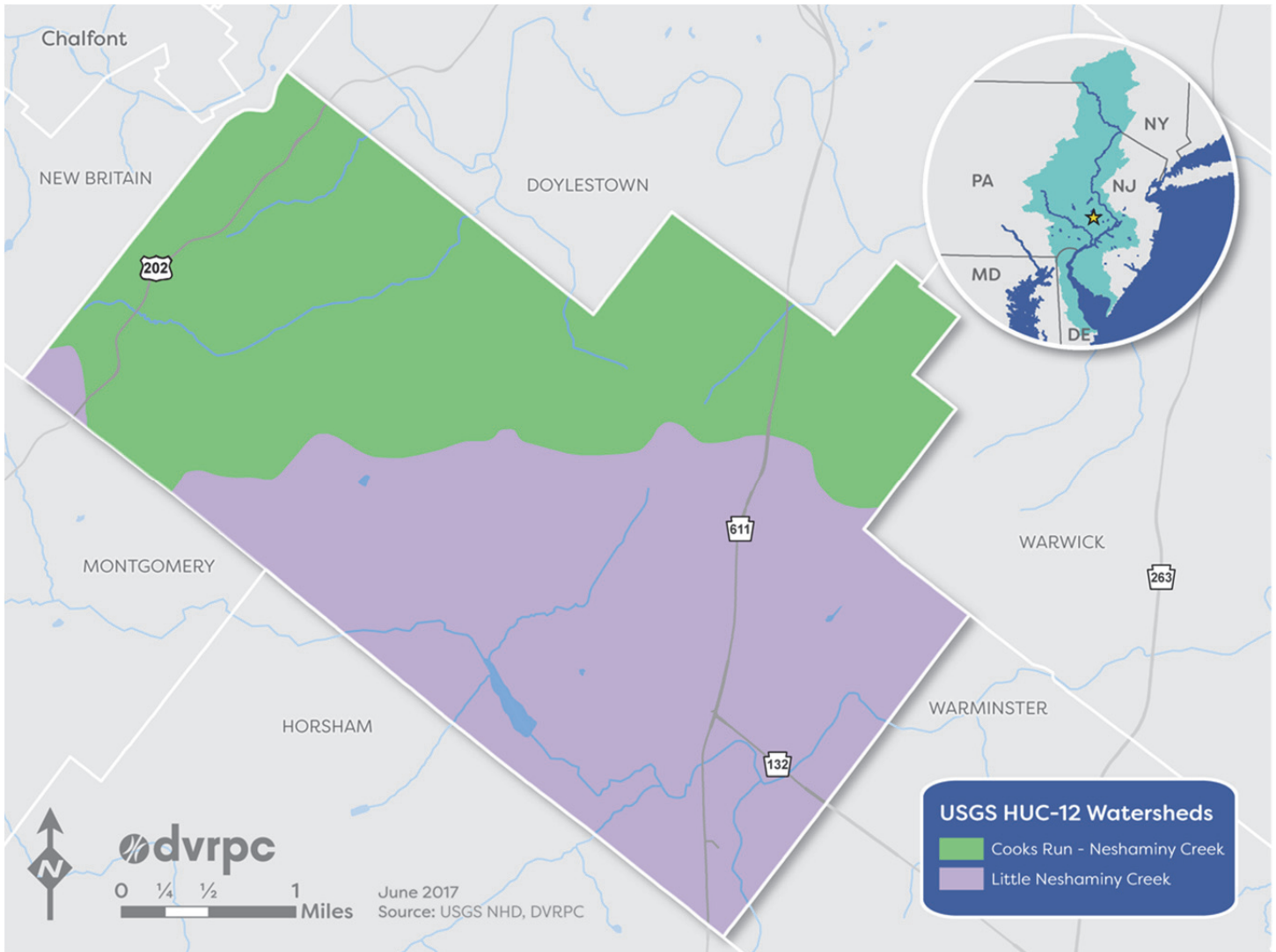
**Watersheds:**  
 Neshaminy Creek and Little Neshaminy

**Population:** 23,942 (2015)

**Land area:** 13.8 square miles

**Population density:** 1,735 people per square miles (13.73%)

Map: Warrington Township's Watersheds



Historically, the Township relied on both surface water and groundwater for its water supply; recent contamination of groundwater has necessitated increased reliance on surface water supplies.

**Water Quality Problems**

The major challenge facing Warrington in recent years has been contamination of the township’s drinking water aquifers. Industrial contamination caused by past metal plating activities and use of fire-fighting foam for practice exercises at the Willow Grove Naval Air Station resulted in runoff that leached into the township’s aquifers over time. The main culprits are PFCs, of which perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) are the primary chemicals in fire-fighting foam. Discharges of these contaminants went undetected for many years.

Contamination first became widely known in October 2014. Township residents immediately turned to social media and became a strong force in getting the township, the Air National Guard, the Pennsylvania Department of Environmental Protection (PADEP), and the U.S. Environmental Protection Agency (EPA) to

take these issues seriously. Although initially a fair amount of finger-pointing took place, citizen participation contributed to cooperative understanding and needed action.

The townships of Warrington, Warminster, and Horsham have all been affected by contaminants from the Naval Air Station. Contamination was first discovered through a sampling protocol established by the EPA for PFCs. The EPA, through its Unregulated Contaminant Monitoring Rule (UCMR), requires monitoring for systems of 10,000 people or less. By late October 2014 the measured amounts of PFOA and PFOS exceeded the EPA Provisional Health Advisory Level, and three of the township's wells were shut down. In May 2016, a new EPA Health Advisory Level (HAL) was released. Based on research from the Centers for Disease Control and Prevention, the new HAL recommends that drinking water contain no more than 70 parts per trillion of these compounds; of the nine wells previously used for public supply, five (including the previously shuttered wells) exceeded this standard. While these contaminants remain unregulated, the release of the new HAL prompted the township take two additional wells off-line.

## Key Partners

**PADEP:** This state agency collects water quality data to determine water quality impairments and has been helpful in working with the townships to interpret technical information and guide action.

**EPA Region 3:** Responsible for Clean Water Act enforcement in Pennsylvania, including coordination with other federal agencies involved in testing and enforcement.

**Air National Guard (Department of Defense):** From 1942 to 2011, the Naval Air Station provided support infrastructure and services to assigned air units to maintain readiness and training goals. The station has been occupied by both the Navy and Air National Guard for many years. In 2005, the base was directed to close, and flight operation ceased in 2011. The Navy's portion of the base is undergoing environmental restoration; the Air National Guard portion of the base is still occupied. The facility is now in caretaker status, pending property transfer to a redevelopment authority. Past activities at the station are known contributors to the aquifer contamination currently being addressed.

**Warrington, Warminster, and Horsham townships:** The three municipalities directly affected by aquifer contamination.

**Active citizens:** Loosely formed initially, this group nonetheless coalesced into an effective stakeholder that took to the Internet, attended public meetings, and worked cooperatively with the township to act.

Currently water is being purchased through NWWA. As of August 2016, Warrington has been negotiating with NWWA to fully transition portions of the township over to Forest Park Water Treatment Plant water. Historically, roughly half of the township relied on water from NWWA. A new water supply agreement was executed between the township and NWWA to supply the entire township's public water system with water from Forest Park. The transition to this water supply will begin after additional infrastructure is installed to facilitate the conveyance of Forest Park water throughout the entire public water system.

Since 2014, the township has been confronted with the sometimes arduous task of working cooperatively with PADEP, the EPA, and the Air National Guard (Department of Defense), while simultaneously working to assure the public that everything is being done to secure and maintain a safe water supply.

## Water Quality Solutions

Contamination issues in recent years have elevated water to the highest priority for the township. As Christian Jones, Warrington Township's director of water and sewer and assistant to the manager, stated, "It is only after such an event happens that people realize the

importance of protecting their water supply. The Township's aquifer will be needed for future generations, so it is incumbent upon us to clean the aquifer over time." From the standpoint of Rick Zeitler, operations manager

at the Warrington Township Water and Sewer Department, the most important strategy to protect and improve water quality is the Safe Drinking Water Act. Were it not for this landmark legislation, corrective action would not have happened nearly fast enough.

The most important strategy for protecting water quality is the cooperative agreement the township has with the Air National Guard to treat water in a granular activated carbon filtration system. This system is being used primarily to treat well water for backup purposes (and for periods of high demand). In order to use this system and have water available when needed, water must be run from the wells for six hours, one day a week. Currently, this water is being mixed with other potable sources and distributed throughout the system (the EPA and PADEP will not permit the water to be stream discharged).

According to township staff, one of Warrington’s most important actions was the creation of wellhead protection zones around the township’s wells. A wellhead protection plan was developed that evaluated, among other things, zones of influence and surface water interaction. Wellhead protection zones were established based on PADEP guidelines and an assessment of risks for each well; in addition, the township examined emergency procedures for spill management. Final plans for each well were submitted to PADEP for approval.

The real champions of the community are the township’s elected officials and its residents, both of whom have been strong advocates for providing a clean and safe water supply to the community. Members of the Township’s Environmental Advisory Committee have also done much to advocate for the protection of the township’s environmental resources and have been involved in water, sewer, and stormwater issues, including joint efforts to protect the Neshaminy Creek.

The natural resources of Warrington that benefit most from the township’s commitment to water quality protection include the Neshaminy Creek and the Bucks County Bradford Dam and Reservoir. In recent years the township, in partnership with PECO and Bucks County, have invested heavily in creating hiking and biking trails around the reservoir and establishing native plant gardens to manage and control stormwater.

As of this writing, long-term cleanup of the chemical plume has not been achieved (funding for such work has been elusive, and the Air

### Motivating Factors

**Failing infrastructure:** Contamination of drinking water aquifers led the township to coordinate with regulatory agencies and take action to find other sources of water supply.

**HAL:** A sampling protocol established by the EPA for PFCs identified local contamination of water supply aquifers. Although a UCMR required testing every five years, a HAL issued by the EPA concerned residents and the township, leading to municipal action.

**Local partners:** Public outcry initially led to township action to find new sources of public water; stakeholder cooperation has contributed to progress.

**Unifying issues:** Aquifer contamination and the inability of action by regulatory agencies led to municipal involvement and subsequent action.



Source: Warrington Township  
This photo shows a system that is distributing fire-fighting foam in a military hangar.



National Guard rejected a recent soil remediation proposal). Uncertainty regarding the health effects of the contaminants, their long-term exposure, and the viability of treating water over time led the township to negotiate with NWWA for potable water. Ultimately the township would like to see the contamination addressed, but in the absence of federal regulations, it may be some time before large-scale use of the township's wells will be possible.

## Progress to Date and Challenges Ahead

The township efforts have been successful: community wells are being treated or are off-line, potable water is available to all residents of the township, citizen complaints were heeded, and community outreach has improved. Initial public acrimony over the problem led to a firm resolve by the community to respond in a proactive and decisive manner.

The township currently receives legal guidance and technical assistance to perform needed water supply testing and monitor contaminants. PADEP provides regulatory oversight of the filtration system.

The primary source of outside technical assistance the township receives is from PADEP. The township believes PADEP has been very helpful in providing guidance throughout this process, although at times the township has found their assistance to be highly technical and not easily decipherable by township staff or residents. This has contributed to some uneasiness.



Source: Warrington Township  
A series of granular activated carbon filtration tanks used to treat contaminated groundwater in Warrington Township.

The greatest challenge for the township in protecting water quality is funding. The township would like to see more grant opportunities for municipalities in similar situations. To do more, it is likely the township would need to raise water and sewer fees. Unfortunately, while water and sewer facilities provide needed services, the public perception is that water should be "free." Continuing to garner public trust will be imperative to moving forward in the future.

The township does plan to remediate its wells but recognizes it will take time. Granular activated carbon filtration systems are expensive, and soil remediation proposals have not been viewed as viable. Future efforts will

focus on what the township can realistically fund with an eye toward outside grants and assistance as it becomes available.

## Key Factors in Success

The key factors to Warrington's success are:

- 1) The township has an engaged staff that has worked hard to earn the respect of the public and honor its commitment to provide safe drinking water to the residents of the township.

- 2) The township has made a strong effort to engage stakeholders (citizens, PADEP, the EPA, Air National Guard, Warminster and Horsham townships) over the last two years and has continually strived to provide outreach to the public in a manner that will benefit all concerned. Although it can be said that several stakeholders were slow to act in 2014, and at times it has been an uneasy alliance, the township took responsibility and acted in a timely manner once it concluded the contamination was a threat to the public.

Important issues to address in the future will be the costs of ensuring water quality and the importance of continued public education and outreach. The township created a “Water Contamination Information Page” at its website to keep residents informed and updated on stakeholder actions. Part of the problem the township faces is the uncertainty regarding the health effects of the contaminants and the long-term viability of current treatment technologies. And the fact that these contaminants are currently unregulated instills much uncertainty in the process. Regardless, the township is committed to cleaning its aquifers over time.

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