

MUNICIPAL CASE STUDY

Abington Township, Pennsylvania

Because Abington was largely developed before more modern stormwater management practices, the township has long experienced severe flooding events during heavy rains and tropical storms—including some that caused residents to lose their lives. The township has spent approximately \$30 million over the past 15 years addressing runoff and flooding issues. Projects have ranged from large-scale flood abatement (such as the purchase of homes for flood management purposes) to small-scale on-lot grading (to encourage infiltration and channel stormwater).



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Background

Abington Township is an inner-ring bedroom community of Philadelphia, predominantly suburban with mixed-use commercial development. The community was largely built before stormwater management and flood control were incorporated into site engineering. The township is 15.5 square miles with a 2015 population of 55,590 (approximately 3,586 persons per square mile). According to township staff, the community is approximately 96 percent developed. Likewise, Delaware Valley Regional Planning Commission 2010 land use data estimates that less than 2 percent of the township’s land area was considered “vacant,” and about 12 percent of its land area was wooded.

Quick Stats

Abington Township

Watersheds: Pennypack, Wissahickon, and Tookany/Tacony-Frankford

Population: 55,590 (2015)

Land area: 15.5 square miles

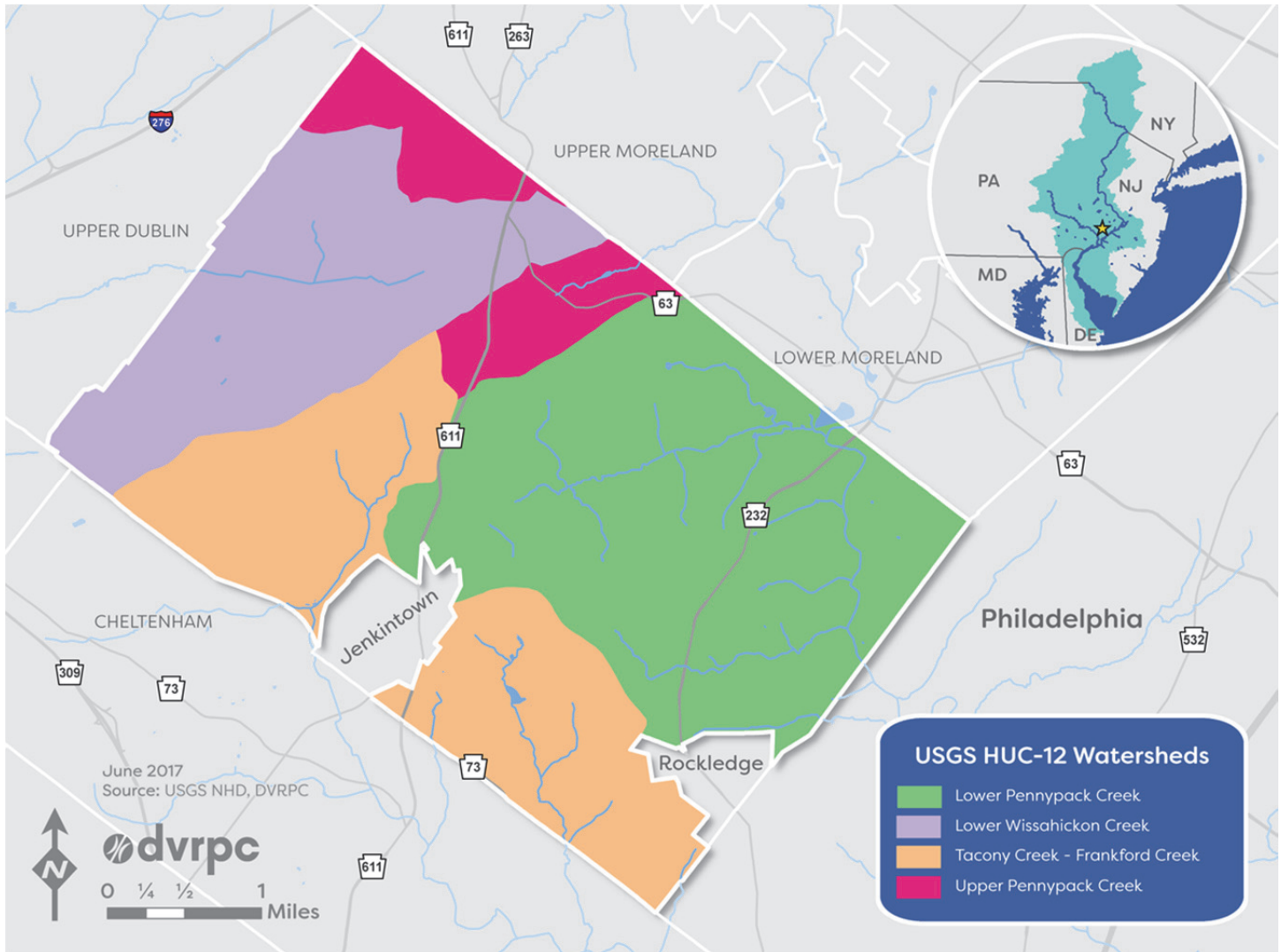
Population density: 3,586 people per square mile

The township falls within three watersheds: the Pennypack Watershed, the Wissahickon Watershed, and the Tookany/Tacony-Frankford (TTF) Watershed. These stream systems provide recreational opportunities and are sources of water supply and wastewater discharge.

Pennypack Watershed

The headwaters of the Pennypack lie in the upper portions of Montgomery County and lower Bucks County; the creek’s middle mainstem traverses through Upper and Lower Moreland townships, as well as Abington, before entering Philadelphia’s Fairmont Park and Pennypack Park and ultimately discharging into a broad mudflat on the Delaware River. Approximately 40 percent of Abington’s land area falls within the Pennypack Watershed. All in all, the stream is approximately 125 linear miles. The Pennypack watershed drains approximately 56 square miles, is approximately 33 percent impervious, and is home to approximately 230,000 people.

Map: Abington Township Watersheds



Wissahickon Watershed

The upper headwaters of the Wissahickon extend from Montgomeryville and the Borough of Lansdale through all or parts of 15 Montgomery County municipalities before draining into the Schuylkill River at Manayunk. The Wissahickon Gorge in the lower watershed has long been preserved as part of Fairmount Park. The stream is approximately 134 linear miles, and its watershed drains approximately 64 square miles. The watershed is approximately 24 percent impervious and is home to approximately 160,000 people. The tributary portion of the Wissahickon Watershed in Abington is referred to as the Sandy Run Creek, and its mainstem begins in the township. Approximately 30 percent of Abington’s land area falls within the Wissahickon (Sandy Run) Watershed.

TTF Watershed

The east stem of the TTF has its headwaters in Abington Township and comprises approximately 30 percent of the township. The creek travels through the communities of Abington, Cheltenham, Jenkintown, Rockledge, and Springfield before entering north Philadelphia on its way to the Delaware River. The stream is

approximately 32 linear miles, and its watershed drains approximately 33 square miles. The creek's watershed is approximately 48 percent impervious and is home to approximately 360,000 people.

Flooding and Stormwater Problems

Because Abington was largely developed before more modern stormwater management practices, the township has long experienced severe flooding events during heavy rains and tropical storms. One of the most significant of these storms claimed the lives of two people in 1996 and resulted in the highest peak rate of flow on the Schuylkill River at Philadelphia since tropical storm Agnes in 1972. Storms during this period and well into the late 1990s would flood upwards of 3,000 homes during any given rainstorm event.

In recent years, the township has also been grappling with stormwater runoff issues and the imposition of the U.S. Environmental Protection Agency's (EPA's) mandated Municipal Separate Storm Sewer System (MS4) program, administered by the Pennsylvania Department of Environmental Protection (PADEP). This program involves the assessment of pollutants in streams throughout the country and charges states and municipalities with making water quality improvements and improving stormwater management. Rivers and creeks that have been assessed by PADEP and the EPA, where warranted, have been assigned restoration goals pursuant to a Total Maximum Daily Load (TMDL), in essence a pollution budget that local jurisdictions must achieve through the treatment of wastewater and management of stormwater before outfall to streams. Where TMDLs do not currently exist, municipalities are charged with developing Pollution Reduction Plans (PRPs) for impaired streams that do not require TMDLs.

In Abington's case the TTF and Pennypack creeks do not currently have TMDL requirements; however, the Wissahickon Creek has TMDLs for sediment and nutrients (established in 2003) and phosphorus (established in 2015). According to township staff, Abington is responsible for developing TMDL reduction plans for the Wissahickon Creek and up to nine PRPs for other subwatershed areas of the township.

Flooding and Stormwater Solutions

In the late 1990s, the township made a significant effort to address its severe flooding issues, starting with the purchase of approximately 40 homes in the floodplain. Of the approximately \$8 million used to purchase the homes, \$7 million was provided by the Federal Emergency Management Agency and \$1 million was provided by the township. These homes were razed and the land

Motivating Factors

Natural disasters: Flooding events in the late 1990s and early 2000s resulted in large-scale flooding in the community and loss of life.

Regulatory: Nutrient and sediment TMDLs of the past, new phosphorus TMDLs, and MS4 permit requirements requiring water quality improvements.

Funding: Federal funding for USACE work, William Penn Foundation grant money for numerous non-profit-sponsored watershed improvements and TMDL alternatives planning for four municipal wastewater treatment plants, Growing Greener funding for the construction of stormwater BMPs, and municipal bond funding for flood abatement and stormwater BMPs.

Local partners: Public outcry over flooding initially led to township action to alleviate impacts; partners over the years have contributed greatly to progress in the township, including the Wissahickon Valley Watershed Association, the Tookany/Tacony-Frankford Watershed Partnership, the USACE, the township EAC and Tree Commission, Temple University's Center for Sustainable Communities, and PADEP.

Unifying issues: Flood losses, including the loss of life; MS4 requirements and the legal obligation to respond.

converted to open space for flood control and parkland. The homes purchased were in all three of the township's watersheds: 18 in the TTF, 13 in the Sandy Run (Wissahickon), and nine in the Pennypack. Because of this effort, flood claims dropped significantly, from 3,000–4,000 to 100–200. This type of work continues today, with the township utilizing federal funds, township municipal funds, and third-party grants to purchase homes for conversion to open space.

In all, the township has spent approximately \$30 million over the past 15 years addressing runoff and flooding issues. Projects have ranged from large-scale flood abatement (such as the purchase of homes for flood management purposes) to small-scale on-lot grading (to encourage infiltration and channel stormwater). The township has created meadows and earthen dams, converted concrete culverts to stone gabions, improved on-site detention facilities, and incorporated bioretention facilities into projects throughout the community. Initially, projects were selected to address flooding issues; lately, the township has been prioritizing projects that meet flooding, MS4, and TMDL requirements.

In recent years the township has issued bonds for \$3–\$4 million every two to three years to address stormwater and flooding issues. This process is largely "resident driven," and the township has not had to seek resident approval or referendums for such work. Citizen complaints ("squeaky wheels") are investigated, and problem areas are incorporated into the township's ongoing floodplain and stormwater work program. The last round of bonds, issued in 2014, was used for 32 projects at a cost of \$3.6 million. The majority of these funds were used to address flooding issues, among them: streambank repairs, pipe-in-ground transport, and flood control. While the township has undertaken in-house design of projects, outside contractors are used for the majority of construction.

One of the reasons the township has been so successful with this approach is that it has little to no debt service and has adequately managed the debt it does have. New bonds are accumulated and paid down over time to address concerns. Over the next year the township intends to issue a new bond to undertake 25 projects ranging in cost from \$25,000 to \$250,000. Projects in the pipeline include additional retention (for larger storms), installation of new storm sewer piping and inlets, streambank stabilization, and additional on-lot grading. Projects aimed at satisfying MS4 requirements include naturalizing (converting) existing stormwater retention basins, constructing infiltration basins, undertaking streambank stabilization, and creating rain gardens, riparian buffers, and meadows in local parks.

The Wissahickon TMDL for phosphorus placed significant burdens on the wastewater treatment plants servicing the townships of Abington, Upper Gwynedd, and Upper Dublin, and the Borough of Ambler. As originally envisioned, the restrictions placed on the treatment facilities by PADEP and the EPA were considered exceptionally onerous, and the municipalities appealed what they saw as the prohibitive cost of meeting the implementation of the prescribed standards. Discussions among the parties led the regulatory agencies to an intergovernmental agreement for the preparation of an alternative plan that binds the municipalities to work together to develop a regional approach to phosphorus reduction. Various grants, in particular a grant through the William Penn Foundation, have allowed this process to proceed in a timely manner.

The costs of meeting TMDL requirements elsewhere in Abington led the township to seek help from Congressman Brendan Boyle, who was able to involve the U.S. Army Corps of Engineers (USACE) in an analysis of and stream restoration for the Sandy Run Creek, a tributary of the Wissahickon Creek.

Another activity that benefitted the township included research undertaken locally by Temple University's Center for Sustainable Communities, which led to the preparation of a Growing Greener grant to construct five Best Management Practices (BMPs), among them rain gardens, infiltration berms, infiltration trenches, and buffer restorations. These projects were undertaken in all three watersheds. Temple has also provided assistance in recent years to the local watershed associations to undertake stream testing.

Abington was one of the first communities in Pennsylvania to be issued an MS4 permit. In addition to the projects mentioned above, the township has undertaken an update of its stormwater ordinance to require controls for small sheds and other structures. Any structure under 250 square feet must utilize two rain barrels or a seepage pit. Structures between 250 and 1,000 square feet must incorporate rain gardens or bioretention cells, and any impact greater than 1,000 square feet must submit a fully engineered plan for review and control of one year and greater storms. The township has long used practices like street sweeping to address contaminants along roadways.

The Township's Environmental Advisory Council (EAC) also contributes by raising awareness of stormwater issues, enhancing participation in stormwater programs, and encouraging citizens and businesses to take action to help mitigate stormwater problems. For example, the EAC has been offering, with township financial support, stormwater educational workshops and rain barrel programs to homeowners and businesses for many years; further, the EAC participates in water quality monitoring projects, actively participates in tree planting and riparian buffer restorations, and recently supported the township's efforts to have the USACE undertake a separate flood study for Abington. In all, the township estimates that 400–600 people have attended the EAC's programs.



Source: Abington Township
Abington Township's Parks and Recreational Department wanted to enlarge the crushed stone parking area near Roslyn Park and decided to add a rain garden on the down slope to assist with drainage and water quality.

The township has also been fortunate in recent years to have had the investment of time and money from several outside organizations. Two watershed associations, the Wissahickon Valley Watershed Association and the Tookany/Tacony-Frankford Watershed Partnership, have provided support in a variety of ways: both provide direct citizen education, and both have worked with the township to identify small stormwater and water quality improvement projects for which the organizations then prepare and administer grants in conjunction with the township. The funded projects include reforestation initiatives, riparian buffer planting, and streambank stabilization projects. Both groups have also worked with local school districts to provide classroom instruction. As part of a larger collaborative effort under the Delaware River Watershed Initiative, these same organizations have been training volunteers to monitor water quality

(both monthly observations and chemical testing). Referred to as "Streamkeepers," these volunteers have been responsible for assessing the effectiveness of restoration and stormwater management projects since

2014. Data generated as part of the overall testing program is housed with the watershed associations and made available to the township and others (regulatory agencies, etc.) upon request.

The projects undertaken by the EAC and the watershed groups have benefitted the township in numerous ways, not least of which is the ability of the township to document this work as partial fulfillment of Municipal Control Measures 1 (Public Education and Outreach) and 2 (Public Involvement and Participation) under its MS4 permit responsibilities.



Source: Abington Township
The township decided to use the property on Hamel Avenue as an underground stormwater detention area. In 2007, the township used capital improvement funds to construct a series of pipes in a stone bed for this purpose. After construction, the township replanted grass to make the area look like open space.



Source: Abington Township
In 2005, Abington Township used federal and state grant money and township funds to purchase this privately owned (40' x 114' +/-) property on Hamel Avenue. The property had been inundated with stormwater during heavy downpours, causing repeated property damage.

Progress to Date and Challenges Ahead

The township sees its efforts as successful: stormwater impacts have been reduced, complaints are down, there is less flooding, and the community has seen corresponding improvements in water quality (as evidenced in both the work of the “Streamkeepers” and Temple University). In addition, the township believes its parks, waterways, and trails have benefitted significantly from water quality protection measures. In addition, the township has greatly benefitted from partnerships with other parties and from the research and outreach of local watershed groups and universities.

According to Township Manager Michael LeFevre, Abington greatly benefits from having an in-house engineer, Michael Powers, who knows the community well and can investigate problems (sometimes identifying the problems before residents even complain), assess impacts, undertake design, manage bidding, and oversee construction. Michael has been with the township for over 37 years and has worked on flooding, sanitary sewer, and stormwater issues throughout his tenure. He has traditionally trained in-house staff himself and has indicated that his major interests lie in finding solutions to the water resources problems he has seen in the township through those years.

While the township has done much to alleviate flooding concerns and manage stormwater, much work remains. Pressure exists to

Key Partners

Abington Township: Township staff and elected officials are very involved in TMDLs and stormwater BMPs in Abington. Abington also greatly benefits from having an in-house engineer, Michael Powers, who has been with the township for over 37 years.

Abington Township EAC: Raises awareness of stormwater issues, enhances participation in stormwater programs, and encourages citizens and businesses to take action to help mitigate stormwater problems. The EAC offers stormwater educational workshops and rain barrel programs to homeowners and businesses, participates in water quality monitoring projects, and plants trees and restores riparian buffers. The township estimates 400–600 people have attended EAC’s programs.

Wissahickon Valley Watershed Association and Tookany/Tacony-Frankford Watershed Partnership: Both provide citizen education and have worked with the township to identify small stormwater and water quality improvement projects and apply for grants to implement them. Both organizations train “Streamkeeper” volunteers to monitor water quality (both monthly observations and chemical testing).

Temple University’s Center for Sustainable Communities: Research undertaken by Temple University’s Center for Sustainable Communities led to the preparation of a Growing Greener grant to construct five BMPs, among them rain gardens, infiltration berms, infiltration trenches, and buffer restorations. Temple has also provided assistance in recent years to the local watershed associations to undertake stream testing.

USACE: The USACE analyzed and participated in a stream restoration for the Sandy Run Creek, a tributary of the Wissahickon Creek. They have also been asked to conduct a separate flooding study.

EPA: Responsible for Clean Water Act enforcement, including issues related to TMDLs and MS4s.

PADEP: The state agency determines the status of water quality impairments and assists communities in meeting regulatory requirements.

implement an increasingly burdensome MS4 program. While the township agrees that the intent of the program is good, it also believes that the ability of Pennsylvania townships and boroughs to achieve success is severely limited by the program’s enormous costs. For example, Abington’s permit obligations continue to expand (e.g., the new phosphorous TMDL for the Wissahickon), and the township will be required to prepare eight to nine new pollution prevention plans for its upcoming permit in 2018.

Further, while many flood control projects and stormwater BMPs have been installed, the facilities’ management and maintenance will place significant burdens on the township in the years to come. Although every facility is evaluated and maintained yearly, the township estimates that approximately 30 percent of these will need capital improvements within the next five years.

One final challenge facing the township involves the commitment of its elected officials to do what is needed to achieve water quality improvements. While various members of the township council have been strong advocates of protecting water quality, commitment has ebbed and flowed, especially at those times when controlling taxes and municipal costs have been the top priorities.

Staff and elected officials, while generally supportive of the MS4 program, view it largely as an unfunded mandate that has transferred the costs of water quality to municipalities. And while those interviewed believe Abington has

risen to the challenge, there was some doubt as to whether the township has really taken “ownership” of its program and whether the township could be doing more.

It should be noted that the individuals interviewed for this case study recognize that the township has greatly benefitted from the work of others and the partnerships it has formed. The future, however, will require the township to understand more about how its actions affect other communities. Furthermore, the township will

need to consider whether its current funding strategy (multi-year bonds for identified projects) will be sufficient to address the stormwater and flooding needs of the future; consideration will likely need to be given to developing a dedicated funding source for future efforts—such as a stormwater utility—both for facility construction and long-term operation and maintenance.

Key Factors in Success

The key factors to Abington’s success are:

1) The township’s tax base has allowed it to secure bonds and pay them down in a timely manner, facilitating the construction of needed stormwater and flood reduction projects.

2) The township has made good use of the partnerships, projects, and research opportunities presented to it (e.g., the efforts of the local watershed associations and the township’s EAC, USACE involvement in multiple studies and restoration efforts, the research of Temple University’s Center for Sustainable Communities, PADEP’s guidance and facilitation with the EPA, William Penn Foundation grants for numerous projects on behalf of the creeks of the township). Clearly, the township has benefitted from a wide assortment of actions taken on behalf of the people and environment of the community.

Important issues to address in the future will be the costs of ensuring water quality and the importance of public education. As Michael Filmyer, engineering consultant to the township, said, “Start at the bottom, educate people about the issues the community is facing and how delicate the ecosystem really is. Get people to recognize that they are part of a watershed, that they are both impacted by the problems created upstream and that they contribute to problems downstream.”

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