

Water Treatment, Storage & Transmission

The Philadelphia Water Department has been providing water to citizens since 1801, when, in the aftermath of a series of devastating yellow fever epidemics that killed thousands of people, the city decided it needed a source of water to cleanse the streets, fight fires, and for household purposes. While a number of private water companies had been established in other cities by that time, Philadelphia, with its city-owned and financed system, was one of the first in the U.S. to take on water supply as a municipal responsibility. Water was piped throughout the city, with paying customers served by direct lines to businesses and houses, and free water provided through public hydrants to anyone with a bucket to carry it in.

The city's first system, with a steam engine at Centre Square (the current location of City Hall) and a second engine at the foot of Chestnut Street, drew water from the Schuylkill River. This system was plagued by high costs and technical problems, mostly related the unreliability of the stream engines. In 1815 a new works at Fairmount was opened. Steam engines pumped water up to reservoirs on top of the hill (which was the largest hill close to the city, and the current location of the Philadelphia Museum of Art).

While the steam engines at the Fairmount Water Works were better-designed than those at Centre Square, they were still balky and costly to run, leading to a plan to use water power to pump water into the reservoirs. This was accomplished in 1821, when a dam was completed across the Schuylkill at Fairmount. The dam diverted water to run water wheels to operate the pumps, resulting in a vast improvement in cost and efficiency over steam powered pumping, which was abandoned at Fairmount. Water-powered Jonval turbines were added to Fairmount between 1851 and 1871. By this time, several other pumping steam-powered stations were operating to serve various parts of the City, drawing water from the Schuylkill River, Delaware River, Monoshone Creek (serving the Germantown Water Works) and springs (supplying the Chestnut Hill Water Works).

After the works at Fairmount were decommissioned in 1911, the buildings were retrofitted to house first an aquarium, and later a swimming pool. The restored complex, listed on the National Historic Register, now houses the educational and historical exhibits of the Fairmount Water Works Interpretive Center of the Philadelphia Water Department. The entire site, which also includes a restaurant and a restored historic landscape, is now part of Fairmount Park, and administered by Philadelphia Parks and Recreation.

The City and State passed various anti-pollution laws, beginning in 1828, and the city's purchase of land that became Fairmount Park was an attempt to protect the Schuylkill River watershed from pollution while creating a grand new park. Unfortunately, these and other attempts to prevent pollution of the rivers failed, and both the Delaware and Schuylkill became badly polluted. Combined sewers, carrying stormwater and sewage in the same pipe, emptied directly into the

City's rivers and streams, and dumping of industrial wastes also went largely unchecked. As a result, water-borne diseases, in particular typhoid fever, killed tens of thousands and sickened hundreds of thousands in the period between the Civil War and the beginning of the 20th century.

To alleviate this public health disaster, five slow sand water filtration plants [link to: exhibit] were constructed by the City between 1901 and 1912. Filtration, combined with chlorination of the water supply beginning in 1914, resulted in a dramatic decrease in the incidence of water-borne diseases. The Torresdale Filter Plant (now the Samuel S. Baxter Water Treatment Plant) and the Lardner's Point Pumping Station, which delivered filtered water into the city's vast network of distribution pipes, were both the largest of their kinds in the world at that time.

Between the 1920s and 1940s, the coal-fired steam engines that pumped water in all plants except Fairmount were replaced by electric pumps. Between the late 1940s and the early 1960s, slow sand filters were replaced by more efficient rapid sand filters.

Three water treatment plants – Baxter, in Northeast Philadelphia, Queen Lane, in East Falls, and Belmont, in West Philadelphia – now supply the city and surrounding suburban communities.

Wastewater Treatment & Infrastructure

By 1899, approximately 800 miles of sanitary and storm sewers were in service in Philadelphia; today the system includes just under 3,000 miles of pipes. Most of these sewers emptied directly into the nearest river or stream, resulting in massive pollution of the waterways in and around the city. While water filtration made the polluted river water safe to drink, aquatic life in the rivers suffered greatly, and one swam in the rivers, or drank their raw water, at one's own peril.

A small primary wastewater treatment plant went into operation along Pennypack Creek in 1912, treating the sewage from several city-owned institutions to prevent it from floating upstream to the intake pipe at the Torresdale Water Treatment Plant. In 1914 the city, under state mandate, developed a comprehensive plan for the treatment and collection of sewage, with three treatment plants and hundreds of miles of large intercepting sewers to keep pollution out of rivers and streams.

In 1923 the Northeast Sewage Treatment Plant opened along the Delaware River, but implementation of the rest of the comprehensive system was delayed by the onset of the Depression and World War II. Construction began again in the late 1940s, with the Southeast and Southwest plants opening by the mid-1950s. By the 1980s another massive investment upgraded all three plants to secondary treatment. The design-rated capacity of all three wastewater treatment plants is 522 million gallons a day, with a maximum capacity of 1.044 billion gallons a day. Besides the city's own wastes, the Philadelphia system also treats the sewage of several adjacent communities.