New York City's water supply system is one of the most extensive in the world. During the last century and a half, the system has expanded dramatically just to keep pace with the City's rapid development. The New York City Department of Environmental Protection (DEP) maintains this vast and complex system, ensuring that the water supply is consistently pure and plentiful.

The City's water actually originates as far as 125 miles north and west of the city in three watersheds, which comprise 19 reservoirs and three controlled lakes covering a total area of almost 2,000 sq miles. Water flows through aqueducts to balancing reservoirs that establish a uniform height for water coming from reservoirs with different elevations.

For most of the 20th century, water had been conveyed into the city by Water Tunnels Nos. 1 and 2 – constructed in 1917 and 1936, respectively – deep within the bedrock of New York City. But as early as the 1950s, the City realized the need for a third tunnel to meet the growing demands on the water supply system. Eventually, this led to a capital improvement program implemented in 1970 that included the construction of Water Tunnel No. 3.

The planned tunnel will eventually span more than 60 miles, making it the largest capital construction project in New York City's history. When construction is completed, the tunnel will provide New York City with an alternative source of water delivery; reduce peak flows; facilitate the repair and inspection of the City's two existing tunnels; and increase the city's ability to deliver water to consumers. It is expected to be completed by 2020 at a total cost of $6 billion.

While Water Tunnel No. 3 will not replace the existing two tunnels, the system is designed to improve the dependability of the entire water supply system, thus improving service and pressure to outlying areas of the city. The operation of the new tunnel will also allow inspection and repair to take place in the existing lines for the first time since they were put into operation – ensuring that the reliability of the system will continue for years to come.

Broken up into four stages of construction, Water Tunnel No. 3 travels 400 to 800 ft below the streets of New York City. The first stage, a 13-mile stretch of 24-ft diameter concretelined pressure tunnel (which steps down in diameter to 20 ft) was constructed through bedrock 250 to 800 ft below the bustling streets of Manhattan. Completed in 1998 and costing more than $1 billion to construct, this first stage now extends.
from Hillview Reservoir in Westchester, through the Bronx, northern Manhattan, Queens and across Central Park.

This first activated portion of the tunnel utilizes 14 supply shafts, or risers, along the route to feed into the City's water distribution system. Three of the four unique subsurface valve chambers have already been built to allow the connection of future stages of the tunnel without removing the water or taking any other stage of the tunnel out of service. The three valve chambers are located in the Bronx at Van Cortlandt Park, in Manhattan at Central Park and on Roosevelt Island. Each valve chamber contains a series of 96-in. diameter conduits with valves and flow meters to direct, control and measure the flow of water in sections of the tunnel.

Because the project was conceived several decades ago, the City has been able to develop and implement several technological innovations to expedite construction. For example, acceleration of Stage 2 was achieved by use of a TBM, which replaced conventional drill-and-blast methods used during the construction of Stage 1 and allows for faster and safer activation. TBMs are also planned to be integrated into the construction of Stages 3 and 4.

The addition of Stages 1 and 2 will provide the system with the ability to bypass one or both of City Tunnels No. 1 or 2. The first section of Stage 2 - the Brooklyn-Queens section running through Red Hook, Brooklyn, to Woodside and Astoria, Queens - was activated in 2007. Stage 2 of the project involves a twofold section in Brooklyn/Queens and a section in Manhattan, carrying a price tag of approximately $750 million.

In December 2001, a joint venture of Schiavone, Frontier-Kemper and J.F. Shea broke ground on construction of the last of two portions of Stage 2, the Manhattan link to the Brooklyn/Queens part of Stage 2, which was built at a cost of $1.5 billion.

Construction of the remaining stages of City Tunnel No. 3 has been accelerated by the use of a TBM, which will be lowered in sections and assembled on the tunnel floor. The TBM is expected to allow tunnel workers to excavate at an average of 50 ft. per day at a diameter of 23 ft. - more than twice the rate possible through drilling and blasting methods. Because the TBM bores into the rock, there is less damage at the point of excavation and no noise at the surface to disturb surrounding communities. A sophisticated control system, the placement of its valves in special chambers and the depth of its excavation represent state-of-the-art technology.

The TBM replaces conventional drill-and-blast methods used during the construction of Stage 1, allowing for faster and safer excavation. The combination of Stages 1 and 2 will provide the New York City Water Supply System with the ability to bypass one or both of City Tunnels No. 1 and 2, which will allow for inspection and any needed repairs, for the first time since they were put into operation.

Tunneling on the Manhattan leg of the project began in October 2004, 550 ft below the streets of Manhattan. The tunnel originates from 30th Street on the west side of Manhattan and will run downtown to the Holland Tunnel. A second section loops north from that point up the west side to Lincoln Center. This 8.5-mile section of the tunnel will be activated by 2013 at a cost of approximately $1 billion.

The remaining two stages of Water Tunnel No. 3 are expected to be complete in 2020, with Stage 3 involving construction of a 16-mile long section of tunnel extending from the Van Cortlandt Park Valve Chamber to the Kensico Reservoir. Once Stage 3 is complete, City Tunnel No. 3 will operate at greater pressure, induced by the high elevation of Kensico Reservoir and will also provide an additional aqueduct to supply water to the City, which will parallel the Delaware and Catskill Aqueducts.

The Van Cortlandt Park valve chamber is the control center of City Tunnel No. 3. The Kensico Reservoir, located in Westchester County, collects water from the Catskill and Delaware systems, which provide about 90 percent of the entire water supply.

In Stage 4, water will be delivered to the eastern parts of the Bronx and Queens. This final stage will be 14-miles long and will extend southeast through the Bronx from the Van Cortlandt Park Valve Chamber. It will then travel under the East River into the Flushing area of Queens. When completed, the entire Water Tunnel No. 3 will also include four large underground valve chambers, numerous riser shafts with riser valve and distribution chambers and surface access facilities.