

## The Worshipful Company of Water Conservators.

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### A Historical Perspective on the future of London's water supply

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“Without water there is no life, without sanitation life is short” – Philip Fletcher, CBE, former Chairman of the Office of Water Regulation.

Providing a robust supply of clean and wholesome water and adequate sanitation are vital components to ensuring the commercial growth and success of any major city. This was recognised as far back as two thousand years ago in the days of the Roman Empire. Major civil engineering infrastructure projects such as the aqueducts that served Rome and other major cities in the Roman Empire are a testament to the importance that the Roman's attached to ensuring an adequate supply of clean water, sometimes from up to 50 miles outside the city, unpolluted by city dwellers with adequate drainage carrying waste into the rivers and away to the sea in a one way flow to reduce the risks of disease and pollution.

The sheer scale of these infrastructure projects for their time should not be underestimated. The 11 aqueducts that supplied Rome transported over 1000 MI/d of water into Rome, that's slightly more than the Thames Water Ring Main supplies today. Had Roman principles been followed in London in Victorian times then maybe the cholera epidemics that plagued the city in the mid-1800s could have been avoided.

London is once again facing an important crossroad in terms of future water supply infrastructure. The population of Greater London is forecast to grow by 37% from 8.6 million in 2014 to over 11 million by 2050 (London Infrastructure Plan 2050). Already South East England is designated as an area of serious water stress. Although it may be possible to mitigate the potential increases in the demand for water in short term by reduced leakage, demand management, increased metering, and increased interconnectivity between water companies, in the long term significant new resources will be required (see Figure 1). Added to this are the uncertainties of climate change on existing water resources, environmental pressures to reduce pumping from groundwater sources that have degraded key rivers, plus the increased pressure of a growing population on land drainage and the quality of our rivers, that make it more difficult to precisely plan when new resources may be needed.

Based on this scenario the risks of supply shortages are likely to be much greater in the 21<sup>st</sup> century than they were in the 20<sup>th</sup> century.

On the plus side, there is still a potential untapped resource available from the River Thames. The flow across Teddington Weir into the tidal section of the Thames is still plentiful in non-drought periods. However, the construction of additional bankside storage could take at least 15-20 years in terms of planning and construction. Figure 1 indicates that by 2027 a major new resource will be required. From this perspective time is not on our side. If bankside storage is to be considered as a potential option it needs to be debated and planned now. The 10 existing major storage reservoirs that make up almost all of the raw water storage that now serves London were constructed at regular intervals over a 74 year period between 1902 and 1976. It is now almost 40 years since the commissioning of the last of these in 1976.

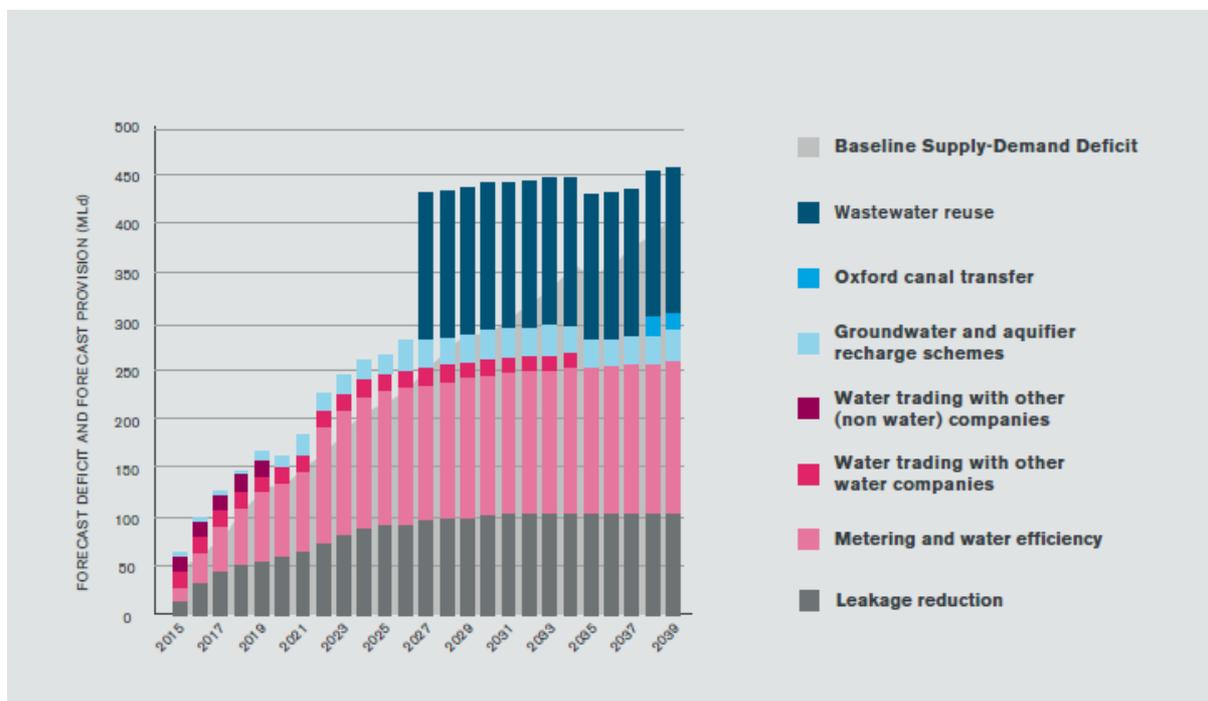


Figure 1 – Thames Water’s proposed measures to 2020 and beyond to balance supply and demand – London Infrastructure Plan 2050 – Source Thames Water 2014

Alternatives such as desalination and water reuse schemes offer shorter planning horizons than raw water storage but have massive carbon penalties in terms of energy use, and will have much higher maintenance and operating costs than conventional slow sand filter treatment. Also, it is difficult to predict what future unknowns may arise when water is continuously recirculated within a river catchment. When Ralph Dodd recommended pumping water directly from the tidal Thames as the potential intake sites for the new

London Water Companies in his “Observations on Water” in 1805, did he envisage that within 50 years legislation would force the companies to move their intakes upstream beyond the tidal section at great expense to overcome the major health risk to the capital.

The current biological water treatment works with their rapid gravity and slow sand filters have served London well since the first implementation of slow sand filters at Chelsea Waterworks engineered by James Simpson in 1829. Supplying around two thirds of Central London’s water, they contribute greatly towards Thames Water’s industry leading water quality compliance score.

Additional bankside storage and expansion of the current slow sand water treatment works is certainly a feasible option to resolve London’s long term water supply issues. This combination offers a solution that is robust, low risk, low cost to operate and maintain, and low carbon impact. Although we have infinitely more technology available at our fingertips today I believe we can still learn something from the principles of the Roman supply systems of 2000 years ago. My main concern is that additional reservoir storage is currently viewed as the last resort in water resource options rather than the preferred option after demand management and leakage.

Of course, and rightly so, there will be objections to any major infrastructure project often because of the disruption and change it brings to local communities. This is no different from the objections Myddelton and Colthurst faced from landowners in the early 1600s when attempting to construct the New River, a major water supply infrastructure project that has stood the test of time and still serves London with around 10% of water supplied to the capital today.

We see the debate on the other key potential London infrastructure projects such as the high speed rail link, the future expansion of airport capacity and the Thames Tideway Tunnel widely in the news. My concern is that while a strong and healthy debate is on-going on these all key issues for London’s future, by comparison the debate on the future of London’s water supply is somewhat muted. The Worshipful Company of Water Conservators, with a wealth of independent water industry experts amongst its membership, plus the WET10 group of Livery Companies can play a key role in stimulating and informing this water debate, which is needed now.

I hope this perspective also demonstrates the key role that understanding London’s past water supply history can play in determining its future. Nelson was Britain’s greatest admiral because he first studied naval history rigorously before applying his own innovative tactics to such success. You cannot hope to control the future without first understanding the past.