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Editorial
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Editorial: London's super sewer – the Thames Tideway Tunnel

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1. Background and project overview

Civil engineers have the privilege of working on many and varied activities that are of benefit to society. On occasion, they have the opportunity to be involved in a project that is truly career-defining and of great significance to themselves and their colleagues, to the wider engineering profession and to the community as a whole. The Thames Tideway Tunnel is one such project and is the subject of this special edition of *Proceedings of the Institution of Civil Engineers – Civil Engineering*.

When the Victorian engineer Sir Joseph Bazalgette led the planning and construction of London's original sewerage system between 1859 and 1875, London – and the world generally – was a very different place. Since then, the population of the city has significantly increased, from 3.8 million in 1871 to 8.8 million in 2013 (ONS, 2013), and approaches to civil engineering have developed and evolved to include concepts such as sustainability, net-zero, climate resilience and nature-based solutions that were unheard of 150 years ago. It is within this context of modern civil engineering practice that the Thames Tideway Tunnel was designed and developed for the London of the present day and for the London of the future.

Construction on the Thames Tideway Tunnel began in 2016. Comprising 25 km of main sewer tunnels and 6 km of connection tunnels, the aim was to enhance London's sewerage infrastructure and protect the tidal River Thames from pollution. The Institution of Civil Engineers has followed with interest this 'once-in-a-lifetime' infrastructure project as it has developed, with previously published papers on the progress of construction (Alder and Appleton, 2017), on health, safety and wellbeing (Alder *et al*., 2022) and on operations through the Covid-19 pandemic (Trigle, 2022). The scheme as it neared completion is reviewed in this special edition of *Civil Engineering*, which includes papers that cover a range of perspectives, including an introduction (Mitchell, 2025), historical context, procurement and financing (Grant and Bailey, 2025; Smith *et al*., 2025), design and construction (Chittenden *et al*., 2025; Eccles *et al*., 2025; Fricker *et al*., 2025; Gonzalez *et al*., 2025; Lewis *et al*., 2025a; Newman *et al*., 2025), environmental impacts and benefits (Spikesley and Donnelly, 2025), placemaking and community engagement (Donnelly *et al*., 2025), commissioning, operation and testing (Lewis *et al*., 2025b) and socio-economic legacy (Sage, 2025).

2. Purpose

The overarching aims of the Thames Tideway Tunnel project included environmental protection, enhancement of public health, urban infrastructure improvement, economic benefits and climate resilience. The main purpose of the project was to manage and control combined sewer overflows (CSOs) to the River Thames, where untreated pollution could enter the river during heavy rainfall events. Minimising and reducing the impact of CSOs directly benefits environmental and public health and is crucial as climate change is increasing the frequency and magnitude of heavy rainfall events within the UK (Met Office, 2022). The River Thames is used for a variety of recreational activities, such as boating and swimming, and untreated sewage discharging into it therefore poses serious health risks to the public. Cleaner river water also requires less treatment for onward supply, thereby reducing operational costs for water utility providers. Reducing the CSOs enables London to comply with wastewater objectives set by the UK Environment Agency (Grant and Bailey, 2025; Lewis *et al*., 2025b).

3. Innovation

Such a large-scale project has provided a plethora of engineering minds with the expertise and experience to bring significant innovation to bear when solving the many challenges that were inevitably faced.

Design innovations included new standards for tangential vortex drops and for vertical deaeration within large circular shafts, and a new methodology that was developed for the ventilation design and the control and treatment of air within the sewerage system (Fricker *et al*., 2025). Construction methodologies also pushed new boundaries. For example, hyperbaric interventions included working in compressed air at higher-than-normal pressures – this necessitated mixed-gas breathing apparatus with a corresponding rigorous medical and training regime that required specific approval from the UK Health and Safety Executive (Lewis *et al*., 2025a).

Considerations of ground conditions and tidal flows played a central role in shaping the project's delivery. Hydraulic modelling of tidal flows was undertaken to optimise cofferdam and foreshore structures, balancing the need to respect heritage settings and maintain stable river conditions. At King Edward Memorial Park Foreshore, unexpected variability in the ground, including weak alluvium and peat, led to significant challenges during cofferdam construction. These were addressed through additional investigations and the adoption of deep soil mixing in grillage formation, providing stability for both temporary and permanent works while allowing critical sewer flows to remain operational throughout construction (Gonzalez *et al*., 2025).

Procurement and funding mechanisms for the project were also innovative. A project of this size and complexity was seen – at an early stage – to require an alternative delivery model outside of the normal processes adopted by Thames Water, the ultimate owner and operator of the asset. A special-purpose vehicle was therefore set up and charged with delivering the project on behalf of Thames Water (Grant and Bailey, 2025).

These and other innovative project features are described in detail within this special edition.

4. Associated benefits

Aside from the direct benefits relating to water quality and public health, the project also presented additional opportunities to improve the local environment, economy and community wellbeing. These demonstrate the added value that civil engineers can, and should, look to bring through such transformative undertakings. A key aim was to enhance Londoners' experience of the public realm in the vicinity of the river. New public areas have been created and the project sought to enhance the 'sense of place' of the riverside (Donnelly *et al*., 2025).

During construction, extensive use was made of water-borne vessels, plant and transportation in order to reduce emissions and road congestion associated with vehicle movements. Commitments to minimising the carbon footprint were established. The use of river barges to move excavated material from the tunnels provided secondary benefits in supporting other environmental schemes in the Thames estuary that required large amounts of fill material for landfill capping or the creation of new wetlands (Sage, 2025).

The project sought to improve the local environment through a focus on biodiversity enhancements. In addition to ensuring cleaner river water, project installations have utilised nature-friendly features, and initiatives such as tree planting programmes have been introduced in order to improve the biodiversity of the area (Sage, 2025).

The economic benefits of the project – both in the short term and long term – are also clear. The project's focus on using the river for construction access and transportation has resulted in a significant cohort of trained, skilled boatmasters and the establishment of the Thames Skills Academy. Similarly, apprenticeships were offered in other disciplines such as tunnel operation. Local employment targets were set, resulting in measurable social value. Employment initiatives were established relating to supporting unemployed and vulnerable people, ensuring minimum wage rates, encouraging workforce returnees and facilitating workforce diversity. Longer-term economic benefits will continue through operational and maintenance roles and, in a wider sense, through the urban renewal aspects of the project (Sage, 2025).

5. What the project means for civil engineering moving forward

The Thames Tideway Tunnel project has fittingly built upon and enhanced the significant legacy of the original Bazalgette sewerage system to take London's public health infrastructure into the future. The papers contained in this special edition, for which the authors are gratefully thanked, provide ample evidence of the impressive engineering capability and application that has gone into the planning, design, construction and commissioning of this transformational project for London. As its primary function, the project has secured the health and amenity of the River Thames for the enjoyment of the city's population, but it has also contributed to a wider programme of environmental and community benefits. It thereby represents a successful example of how we, as civil engineers, can bring a holistic view to the positive outcomes that can be generated by such large-scale infrastructure works. It is hoped that readers enjoy the in-depth descriptions of the project and, at the same time, reflect on this wider influence of our profession.

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