Five minute read

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Water security at scale

Delivering tomorrow's reservoirs

Tunnel boring machine retrieval on the Thames Tideway Tunnel project, London

For more than a century, 50 million households and businesses in England and Wales have relied on reservoirs built in the Victorian era and the late 20th century. But the world they were built for no longer exists.

A growing population, new water-intensive industries including data centres, and the pressures of a warming climate now mean the UK faces a potential shortfall of 5 billion litres of water every day by 2050. The impact is already real: shortages are slowing housing delivery in East Anglia and the South East. The need for decisive action could not be clearer.

In response, government and water companies are advancing the most ambitious water-supply investment programme the UK has ever attempted: a £50 billion pipeline of around 30 major schemes, including 11 new reservoirs, major water transfer projects, recycling and desalination. Several reservoirs – among them the White Horse Reservoir in Oxfordshire, and schemes in East Anglia and Lincolnshire – have been designated 'nationally significant', streamlining the planning process and accelerating progress.

Ofwat is reshaping how these assets are financed and delivered, with the majority expected to be competitively procured through models such as Direct Procurement for Customers (DPC) or Specified Infrastructure Project Regulations (SIPR). These frameworks provide strong and predictable revenue guarantees, designed to attract long-term private investment and make complex infrastructure bankable. However, these projects still carry significant execution risk, and their success will depend on partnering with organisations with proven capability in delivering critical national infrastructure safely and efficiently. See our case study on mobilising capital for major water infrastructure.

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A programme of this scale requires careful planning, precision engineering, and integrated environmental design

1

Secure delivery capacity early

Designing, consenting and building major water infrastructure can span several Asset Management Periods (five-year cycles), making planning reforms and 'nationally significant' status crucial. Even once approved, reservoirs can take a decade to build, and with multiple planned alongside other large schemes, competition for skills, equipment and materials will be intense. National Infrastructure and Service Transformation Authority (NISTA) will play a key role in coordinating across government, regulators and contractors to align skills pipelines and supply chains. Companies must also plan strategically, as Balfour Beatty is doing on programmes including Lower Thames Crossing, Sizewell C and Net Zero Teesside. We are also expanding recruitment to meet rising sector-wide skills demand and using AI to optimise workforce deployment. See our case studies on the Thames Tideway Tunnel project – securing delivery capacity early and outcomes-focussed delivery in the @one Alliance.

2

Mastering earthworks at scale

Earthworks form the backbone of every reservoir, involving the excavation and placement of millions of tonnes of soil and rock to create slopes and basins capable of withstanding decades of pressure. The challenge goes beyond sheer volume: Sequencing is critical: rain, utility diversions and planning delays can disrupt the narrow dry-season window, adding months or years. Success depends on early engagement, precise staging, advanced machinery and skilled teams working to exacting safety and quality standards. See our case study on HS2 Major Earthworks.

3

Treating sustainability as a priority

Building a reservoir reshapes landscapes, communities and ecosystems. Because benefits may take years to emerge, delivery must go beyond compliance and be sensitive to local communities. Thoughtfully designed projects create lasting value: new wildlife habitats and wetlands, green spaces for recreation and wellbeing, local employment and skills development. By embedding environmental and social considerations from the outset, including habitat-sensitive construction and prioritising local businesses, reservoirs can leave landscapes, ecosystems and communities stronger more resilient, and richer in opportunity. See our case study on sustainability in action on the M25 Junction 10 scheme.

Reservoirs demand significant expertise: geotechnics, hydrology, ecology, tunnelling and community engagement working in concert. They are complex, time intensive, and costly to deliver, yet they are essential. Few investments matter more to the UK's future than a safe, reliable water supply – and the time to act is now.

Case Study

Mobilising capital for major water infrastructure

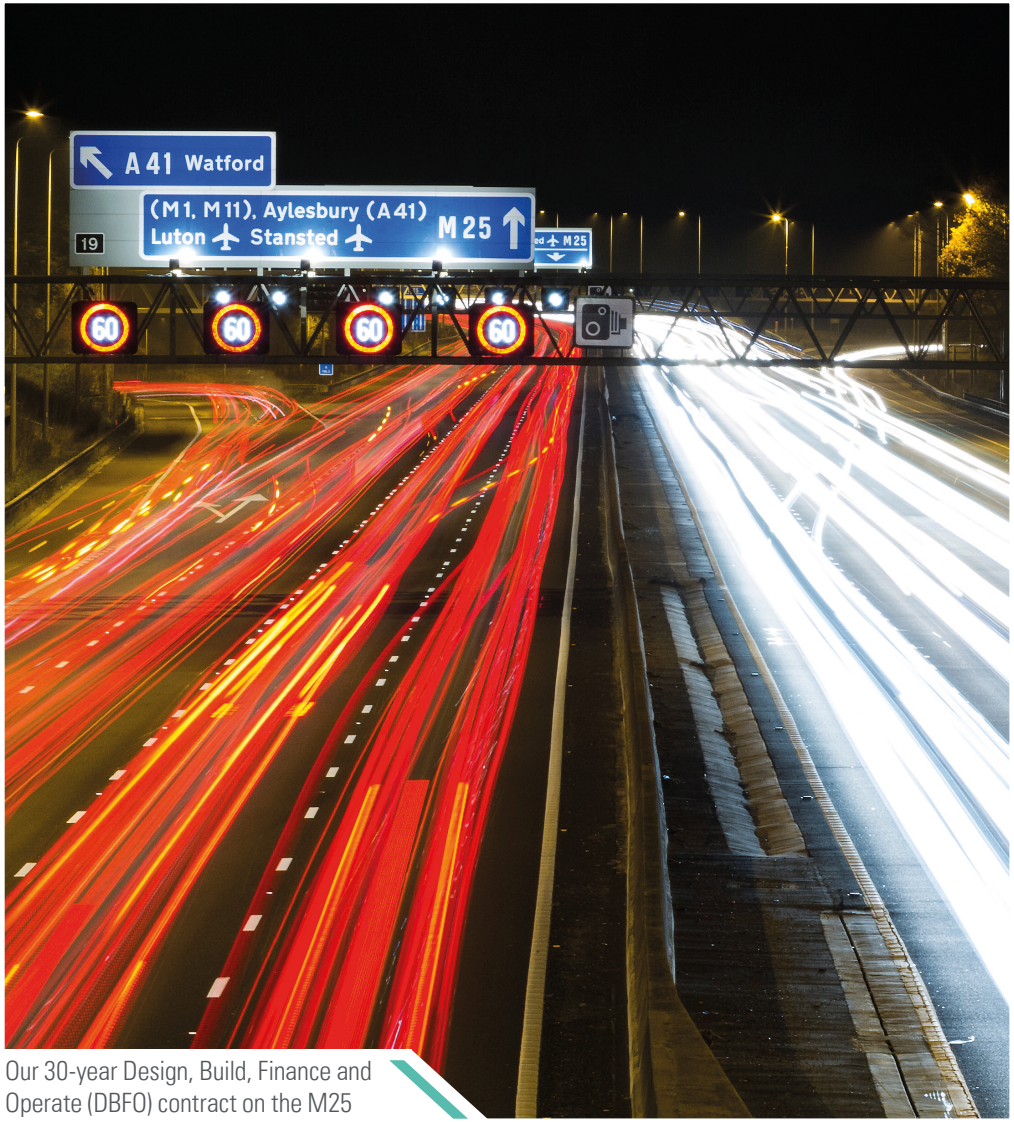
As the UK moves towards a new programme of strategic reservoirs, new financing models such as Direct Procurement for Customers (DPC) and Specified Infrastructure Project Regulations (SIPR) are being introduced to the water sector for the first time. Success under these frameworks depends on partners who can deliver complex infrastructure, attract and manage private investment, mitigate execution risk, and provide predictable outcomes for regulators, customers and communities.

Balfour Beatty Investments has extensive experience in financing, developing and operating nationally significant infrastructure across the UK. Balfour Beatty Investments expertise covers direct equity investment, structured project finance, joint ventures, and long-term alliances, combining technical capability with disciplined financial stewardship. This enables Balfour Beatty Investments to mobilise capital, manage risk and deliver assets that perform reliably over the long term.

A good example is the M25 capacity enhancement project, where Balfour Beatty Investments helped finance and deliver one of the country's most strategically important transport assets. Delivered under a competitive procurement model with clear parallels to DPC, the project involved:

- Third-party financing and delivery
- Long-term operational responsibility
- Structured risk transfer and predictable revenue streams

Balfour Beatty Investments arranged and structured the project finance, invested its own capital, and manages the asset post-completion to support reliable operations. The project shows how private investment, paired with strong delivery capability, can help unlock complex national infrastructure while maintaining transparency, accountability, and long-term value.



Our 30-year Design, Build, Finance and Operate (DBFO) contract on the M25

Balfour Beatty

Case Study

Thames Tideway Tunnel project – securing delivery capacity early

Balfour Beatty, in a joint venture with Morgan Sindall and BAM Nuttall, delivered the seven-kilometre West section of the Thames Tideway "Super Sewer," stretching from Acton in West London to Wandsworth in South West London. The project involved tunnelling beneath the River Thames to help the sewerage system cope with the growing population and prevent tens of millions of tonnes of pollution from entering the river each year. This section was a critical part of the overall 25 kilometre tunnel (the largest infrastructure project ever undertaken by the UK water industry) and encompassed seven separate work sites along the route. The Thames Tideway Tunnel project was completed on time and on budget in March 2024, becoming operational in February 2025.

Securing delivery capacity early was central to the project's success. Strategic workforce planning, informed by lessons from previous major projects including Crossrail (Elizabeth Line) and other schemes in London, ensured that our skilled teams were mobilised precisely when needed. Balfour Beatty also created 72 apprenticeships, including a tunnel apprenticeship programme with Tunnelling and Underground Construction Academy (TUCA) and invested in building a pipeline of skilled operators and specialists ready to meet the ongoing demands of complex tunnelling operations.

Advanced technology underpinned early and efficient delivery. Building Information Modelling (BIM) was used to test and simulate construction before works started on site, enabling safe, optimised sequencing, efficient deployment of the workforce and minimising disruption to local residents. A significant proportion of materials were transported by river, and investment in muck-away tugs and barges removed spoil efficiently, avoiding approximately 45,000 lorry movements. This approach reduced road congestion, cut emissions and minimised disruption throughout the project.

People and collaboration were at the heart of delivery throughout. Strong relationships with the customer and stakeholders, joint initiatives, and a shared project identity ensured alignment across the team. Community engagement included over 12,000 hours of volunteering, more than 5,000 hours of STEM activities, and the creation of a new public space in Putney, supporting education, recreation, and long-term community benefit.

Through early workforce planning, integration of advanced technology, and proactive engagement with communities and stakeholders, Balfour Beatty and its partner demonstrated how large-scale, complex infrastructure can be delivered efficiently, safely and sustainably, while leaving a lasting legacy and strengthening the sector's skills base.

Specialist tug boats on their maiden voyage on the Thames Tideway Tunnel project, London

Case Study

Outcomes-focussed delivery in the @one Alliance

Balfour Beatty, together with its @one Alliance partners, has been delivering infrastructure for Anglian Water since 2005. The alliance brings together eight leading organisations to deliver around 40% of Anglian Water's capital delivery programme, making it one of the world's top-performing alliances in the water sector. Its work spans the restoration and assembly of water treatment works and water recycling centres, as well as the replacement and provision of essential infrastructure pipework to support both water and wastewater distribution.

Securing delivery capacity early has been central to the alliance's success. In Asset Management Plan 7 (AMP7), the alliance delivered a £1.2 billion programme while building deeper integration across partners and the supply chain, enabling efficiencies, lower-carbon solutions, improved customer service and a safer working environment. Projects worth approximately £3 billion are planned in Asset Management Plan 8 (AMP8). By coordinating early with Anglian Water, regulators and across the alliance, and leveraging innovative techniques such as pipebusting, sliplining, spray lining, and directional drilling, the partners maximise efficiency and ensure continuity of supply, even in complex or constrained environments.

- **Multi-disciplinary delivery:** The alliance combines expertise across engineering, procurement, commercial management and community engagement to deliver projects on time, on budget and sustainably. For example, the alliance successfully delivered a complex programme of pipeline diversions to support National Highways' A428 improvement scheme, completing all works ahead of programme while maintaining water supply under challenging winter conditions.
- **Building skills and capacity:** Strategic workforce planning across the alliance ensures it has the people and skills to meet sector-wide demand. Initiatives include:
  - **Collaborative Skills Programme:** a pre-apprenticeship programme attracting new talent into the utility sector.
  - **Green Skills Academy:** preparing students for groundworks and engineering apprenticeships.
  - **Training School:** a 10-week programme developing technical and leadership skills.
- **Safety and community focus:** Anglian Water's LIFE 'Safer Every Day' initiative fosters a culture of safety and wellbeing, while the Customer Operating Model minimises disruption, improves communication and enhances customer experience. The alliance has also received multiple awards recognising its commitment to safety, carbon reduction and environmental excellence, including The Royal Society for the Prevention of Accidents Gold (RoSPA) President's Award, and the Water Industry Achievement Carbon Reduction Initiative of the Year Award.

Through early workforce planning, integrated delivery, and investment in people and innovation, the @one Alliance demonstrates how multi-disciplinary collaboration between partners can secure delivery capacity, develop skills, and leave a lasting legacy for communities and the environment, directly aligning with the themes of securing delivery capacity early and treating sustainability as a priority.

Anglian Water's award-winning alliance serving millions UK-wide

Case Study

HS2 major earthworks

On HS2, Balfour Beatty VINCI is delivering a 90 kilometre civil engineering programme linking Long Itchington Wood Green Tunnel in the south to Lichfield in the north, including the landmark Curzon Street station in Birmingham. This is one of the UK's most complex earthworks and ground engineering challenges, involving more than 40 million cubic metres of soil and rock: enough to fill 10,000 Olympic swimming pools.

At Long Itchington Wood Tunnel, our Midlands-based partner Collins Earthworks deployed 120 people and 35 machines at peak to excavate over 300,000 m³ of soil. All machines are low-emission and fitted with GPS, telematics, 360° cameras, rated capacity indicators, and inward-facing operator cameras, combining safety, productivity and real-time monitoring. Drones and high-resolution 3D surveys guide precision excavation and optimise site logistics, while strategic borrow pits allow soil and rock to be stockpiled, processed, and reused efficiently, cutting haulage distances and reducing environmental impact.

Old Oak Common station presents additional challenges. Its basement groundworks include a 1.8 kilometre diaphragm wall with 57,000 m³ of concrete and 11,000 tonnes of reinforcement, alongside 161 rotary bored piles, 2.7 kilometre of plunge columns and extensive structural works. Our in-house plant ensures the right equipment is on hand, operated by highly trained staff.

Balfour Beatty VINCI manages nine major sub-projects across the 90 kilometre programme, forming an Integrated Project Team with HS2, our JV partner VINCI, key suppliers and our Design Joint Venture. In less than 12 months, we mobilised over 1,000 staff and inducted more than 10,000 people onto the programme. Senior leaders from HS2, Balfour Beatty VINCI and our supply chain created a shared values and behavioural framework, supported by an Operating Model built on 15 strategic design principles. By cascading these through bespoke training with the Supply Chain Sustainability School, we have strengthened collaboration across the programme, aligning all parties with project objectives, and ensuring consistent delivery standards across a complex network of suppliers.

Shaping the Midlands' future through pioneering engineering at HS2

HS2 major earthworks cont.

Our plant and fleet services division underpins this delivery. Since 2018, we have invested strategically in in-house earthworks capability to reduce supply risk and add value for our customers. The initial investment included 22 specialist machines worth £3.2 million, supplied through partnerships with Volvo, Komatsu, and Caterpillar. Today, our fleet exceeds £20 million in value, with a further £25 million planned over 18 months to support HS2 and other major UK projects such as Sizewell C. For HS2 Area North alone, circa 85 heavy earthmoving units will be deployed over the next 18 months, building on the 50 already on site. The flexibility of our specialist plant allows machines to be redeployed across major programmes, setting new standards in efficiency, safety and sustainability.

People remain central to delivery. Our Operator Skills Hub in Birmingham equips apprentices and experienced operators to manage modern, digitally-enabled plant, building a workforce capable of meeting the demands of Britain's largest infrastructure programme.

From advanced mass haul planning to cutting-edge plant technology, expert in-house capability, and a highly skilled workforce, Balfour Beatty VINCI combines scale, expertise, and innovation to deliver complex earthworks efficiently, safely, and sustainably. Lessons learned here directly inform our approaches on other major UK projects, including Sizewell C.

Connecting London and Birmingham at HS2 N1

Case Study

M25 Junction 10 / A3 Wisley Interchange – sustainability in action

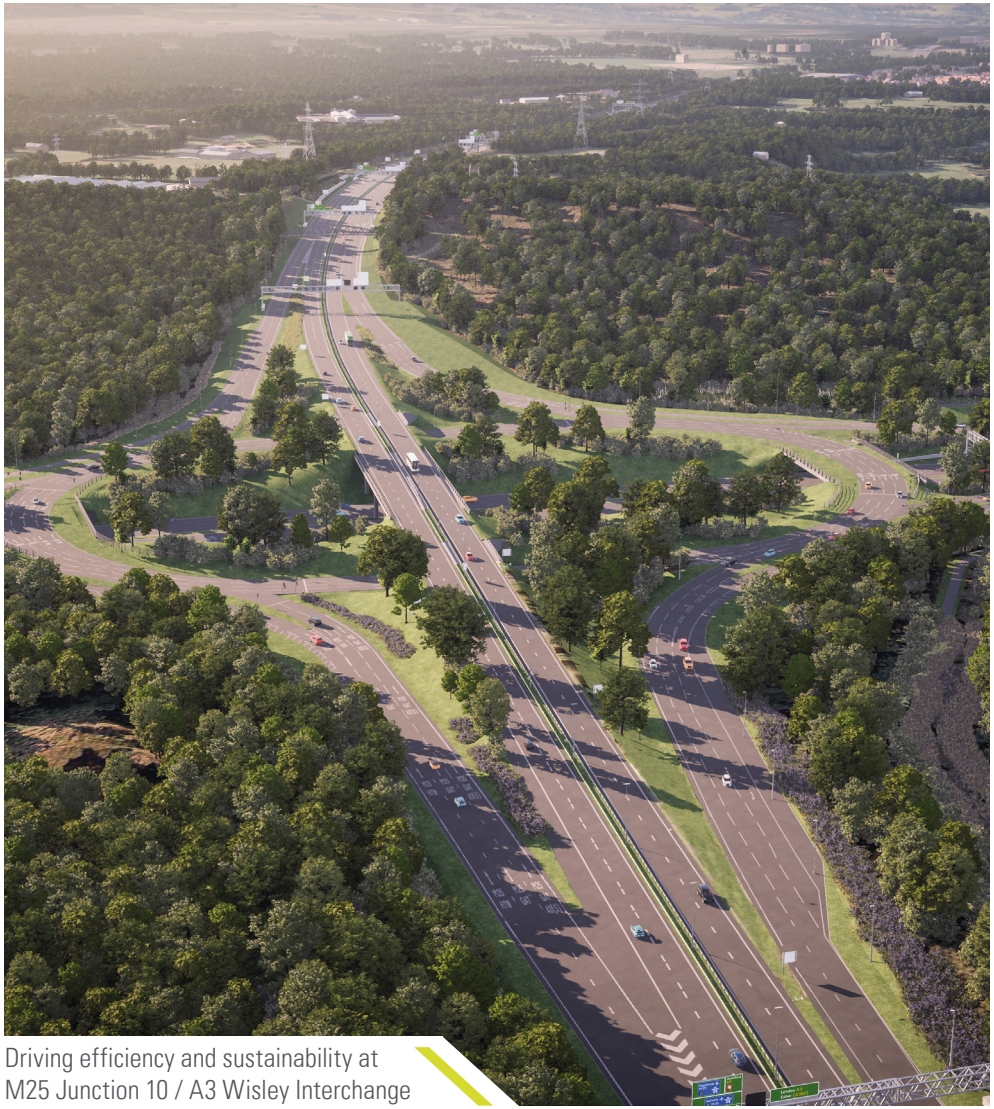
Balfour Beatty's work at the M25 Junction 10 / A3 Wisley Interchange shows how major infrastructure can deliver efficiency and long-term environmental benefits. The scheme includes four new slip roads, eight new bridges, and widening the A3 from two to four lanes in sections, serving over 300,000 vehicles daily while reducing collisions and improving traffic flow.

Working closely with our customer, National Highways, and in partnership with AtkinsRéalis as part of our Strategic Design Partnership, we applied early investment in design and Modern Methods of Construction. This approach delivered tangible results: £5 million saved, 40,000 m³ less imported fill and reduced disruption to road users through minimal closures.

Our on-the-ground ecologists, part of Balfour Beatty's dedicated Natural Environment Team (one of the few across the sector), focussed on safeguarding biodiversity. Their input shaped heathland restoration across 25 hectares, the planting of over 20,000 native trees and shrubs and the creation of new wildlife corridors via the UK's first heathland green bridge, reconnecting Wisley and Ockham Commons after 70 years.

Invasive Japanese knotweed was eradicated using trained sniffer dogs, covering several kilometres of affected verges. Strategic closures and consolidated maintenance activities reduced traffic disruption by 67% during peak works. Resource efficiency was also prioritised, saving over £1.5 million and cutting approximately 7,500 tonnes of embodied carbon. Using the latest low-emission piling rigs, the team kept construction moving efficiently, with the equipment available nearly all the time and emissions significantly reduced.

Through careful planning, early engagement with National Highways, close collaboration with our design partner AtkinsRéalis and sector-leading ecological expertise, the M25 Junction 10 scheme demonstrates how infrastructure can deliver measurable efficiency gains, environmental benefits and long-term community value.



Driving efficiency and sustainability at M25 Junction 10 / A3 Wisley Interchange

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