



**MMB** MOTT MACDONALD  
BENTLEY



# Annual review

2023



Welcome:

# Our busiest year ever

Welcome to our review of 2023. It was our busiest year ever and marked the start of a period of increased growth and opportunity.

My reflections on 2023 almost mirror those of the past two or three years – something I think is telling of the continuing success of the business.

The years do, however, seem to be passing increasingly quickly. With that, I will say that whilst it is important to enjoy the moment, we should also give time to reflect, so I'll share with you some thoughts as I look back on the last 12 months.

### Safety

I'll start with safety. Safety will always be the most important factor in delivering successful projects. We demonstrated great safety performance again last year, but not quite at the level of 2022. We have excellent operational safety standards that keep us safe – but becoming complacent around these causes incidents. We saw examples of this with a small number of incidents last year that resulted from complacency.

2024 will see us continue to reinforce the important messages around safety – choose safe behaviours, challenge unsafe ones and don't become complacent.

### Milestones

We celebrated 10 years of JBA Bentley (JBAB) last year – our design-and-build business with environmental consultants Jeremy Benn Associates. This milestone followed our 50 year celebrations for JN Bentley last year, and 2024 will mark 25 years of Mott MacDonald Bentley (MMB). These are all impressive milestones for the business, but they feel like personal ones too. Celebrating 25 years of MMB will also mark the time I became managing director. I'm sure I and many others will look back fondly on those years and remember all that we have achieved in that time.

For me, partnerships are not short term. I'm proud that we build long-standing relationships, and these have served us well and will continue to do so. I'm certain that it is these partnerships that differentiate us in the market – our established collaborations

with Jeremy Benn Associates and Mott MacDonald bring a unique offering to our clients, something others struggle to replicate in the industry.

### Mott MacDonald

Now an established region in Mott MacDonald, we have cemented our position in the global business, and it feels as interconnected, settled and productive as it has ever been. Our capability and the strength of our teams has never been stronger. The scale and complexity of some of the things we are delivering is breathtaking, as you'll see throughout this review.

### Workload

The water industry remains at the core of our business. You may have seen mention of the industry in the media recently – investment is increasing significantly which brings lots of opportunity for us. But it will be a busy three, four, five years and affordability will be a challenge. Demand for our capabilities will increase. Work-winning may feel easier, but we can't become over-confident. To deliver, we need to keep innovating, keep service-focused and never stop driving to be efficient and client-focused as an organisation.

### Technology

We are seeing more technology coming to the operational part of the industry. If we use it right, it can make the world better and safer. But to do this, we have to use it to our advantage and most importantly, use it right. Don't rail against it: look for opportunities to innovate, to do things differently and utilise the technology available.

This will help us continue to deliver great projects for our clients.

Paul Bentley  
Managing Director



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Paul Bentley  
Managing Director



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Our annual review | This is the annual review of the Mott MacDonald Bentley Contracting (MMBC) Region of Mott MacDonald Group, including JN Bentley, Mott MacDonald Bentley and JBA Bentley.

# 2023 Highlights



Expanding our presence in the north of England, we relocated our Leeds base to new offices at No.1 Whitehall Riverside

Over 100 new graduates and apprentices joined the business in 2023, attending our brand new Early Careers Development Programme launch in Birmingham



Our combined social media following grew by 70%, and we reached 10k followers on our new MMB LinkedIn channel

2023 was another great year for our Early Career Professionals (ECP) network, which hosted a variety of initiatives and events, including the annual ECP day in Manchester

A record 41 apprentices kick-started their careers with us across construction and business support roles - with a further 29 successfully completing their apprenticeships during the year



We achieved gold membership of The 5% Club - recognising our ongoing investment in 'earn and learn' opportunities



We welcomed over 500 new starters across construction, design and support - including 179 new construction workforce employees, a record number



We celebrated 50 award wins, commendations and shortlistings, including two wins and multiple finalist positions at the British Construction Industry Awards

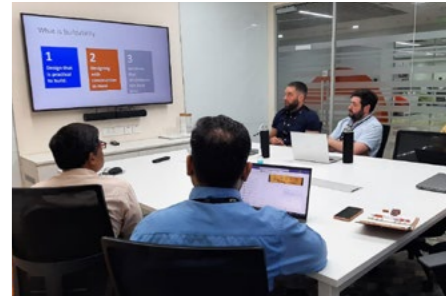


Delivering sustainable low carbon solutions



Summer saw us celebrate 10 years of JBA Bentley, our integrated design-and-build company specialising in the safe and efficient delivery of low carbon solutions

Our dedicated design team based in Mott MacDonald's Global Delivery Service in India went from strength to strength - and now numbers over 130 fantastic colleagues



5,366 training courses took place throughout the year, upskilling and training our directly employed workforce. We're set to carry out even more in 2024!



September saw us enjoy a record single-month turnover as we delivered £45m of work with our clients



SILVER 2023 ecovadis Sustainability Rating



JN Bentley was awarded a silver medal sustainability rating from EcoVadis, placing us in the top 25% of companies assessed



Our Practice Network grew by 47% in 2023, with almost 700 colleagues now sharing knowledge, innovation and best practice across a range of topics

We innovated left, right and centre! Including pioneering new modern methods of construction such as 3D printing and design for manufacturing and assembly (DfMA)



South West Water MMB MOTT MACDONALD BENTLEY



MMB secured its first-ever framework with South West Water - a multi-million-pound AMP8 contract which runs until at least 2028

We demonstrated our flexibility by successfully reacting to 10 'emergency' schemes with the Canal & River Trust



Using the latest technology and telemetry, our procurement team launched an award-winning standard site set-up that reduces energy consumption across our sites



Over 62,000 positive interventions for safety and environment were recorded - a 60% increase on the previous 12 months



Our latest Beyond Zero safety campaigns were launched company-wide - focusing on lifting safely and reinforcing the importance of ankle protection



Over 110 individual CSR activities totalled over 1,600 hours, including environmental volunteering, careers and education visits, fundraising activities and community projects



# Financial review



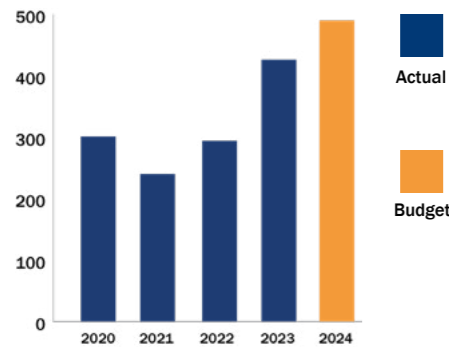
2023 was a year of strong financial performance - maybe our best yet and certainly our best since the formation of the MMBC region. Importantly, workload for all our water clients was profitable. Below are some of our key numbers and hopefully these speak for themselves."



Jonathan Rhodes | Director

## Record MMBC revenue of £426m

Our revenue has now grown steadily for the past 2 years. 2023 revenue was **45% higher than 2022 (£294m) and 78% higher than 2021 (£240m)**. Based on our own tracking of inflation through the BPI (Bentley Price Index), around 18% of the growth since 2021 can be accounted for by inflation with the remainder reflecting our underlying volume growth.



Our top 5 clients in 2023 were: Severn Trent (£93m, up 107%), Anglian Water (£80m, up 100%), Northumbrian Water (£73m, up 48%), Yorkshire Water (£44m, up 24%) and Thames Water (£44m, up 73%). Non-water work at £55m represented 13% of our revenue.

## Fair and prompt payment to our supply chain

In 2023 we signed up to the fair payment charter, committing to pay our regular suppliers within 60 days of invoice and our smallest suppliers within 30 days. Over the past five years we have reduced our average time to pay invoices from **53 days (2018) to 35 days (2023)**. Our strong balance sheet allows us to look after our supply chain but continued processing improvements will help us do better.

## Strong cash collection from our clients

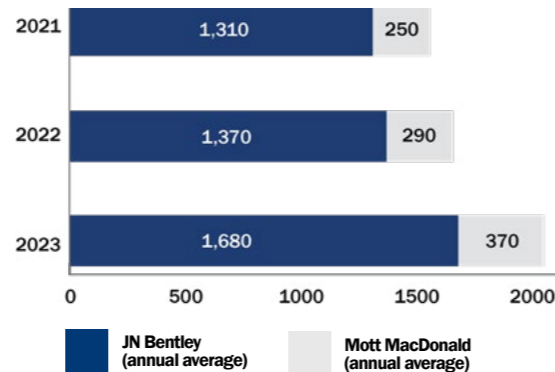
Our commercial teams have worked hard during the year to get paid more quickly by our clients and bring down older amounts due to us. We track the number of days of revenue we have outstanding, and during 2023 this has averaged **33 days (2022: 43 days)**.

## Highest ever year end cash position

We closed the year with **£31.1m** of cash in the bank (December 2022: £11.9m). All contracting businesses require a healthy balance sheet to withstand difficult times and recent industry headlines confirm this is exactly the right strategy for us, giving confidence in our financial stability to our customers, our supply chain and our workforce. As was the case last year we have no external borrowings.

## Record headcount now standing above 2,400

Our headcount has grown steadily to support our volume growth. Headcount averaged **2,050 during 2023 (2022: 1,660)**. Additionally, year-on-year our average revenue per employee has risen by 18% to £208,000. Headcount growth has been highest in general construction roles (to support greater self-delivery) and design roles (to build our capacity early for AMP8). Headcount is currently **2,430** and expected to grow further in 2024 and 2025.

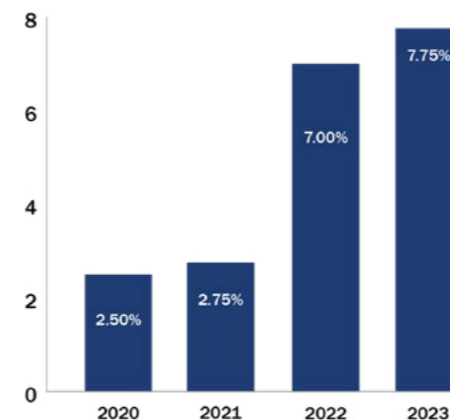


## Record levels of capital investment

**£14.4m** was invested in our plant fleet during 2023 which supported a record financial contribution level from this part of the business. Investment included 68 excavators and 98 vans. Our 2024 budget allows for further fleet growth and diversification, including in green technologies, delivering additional contribution growth.

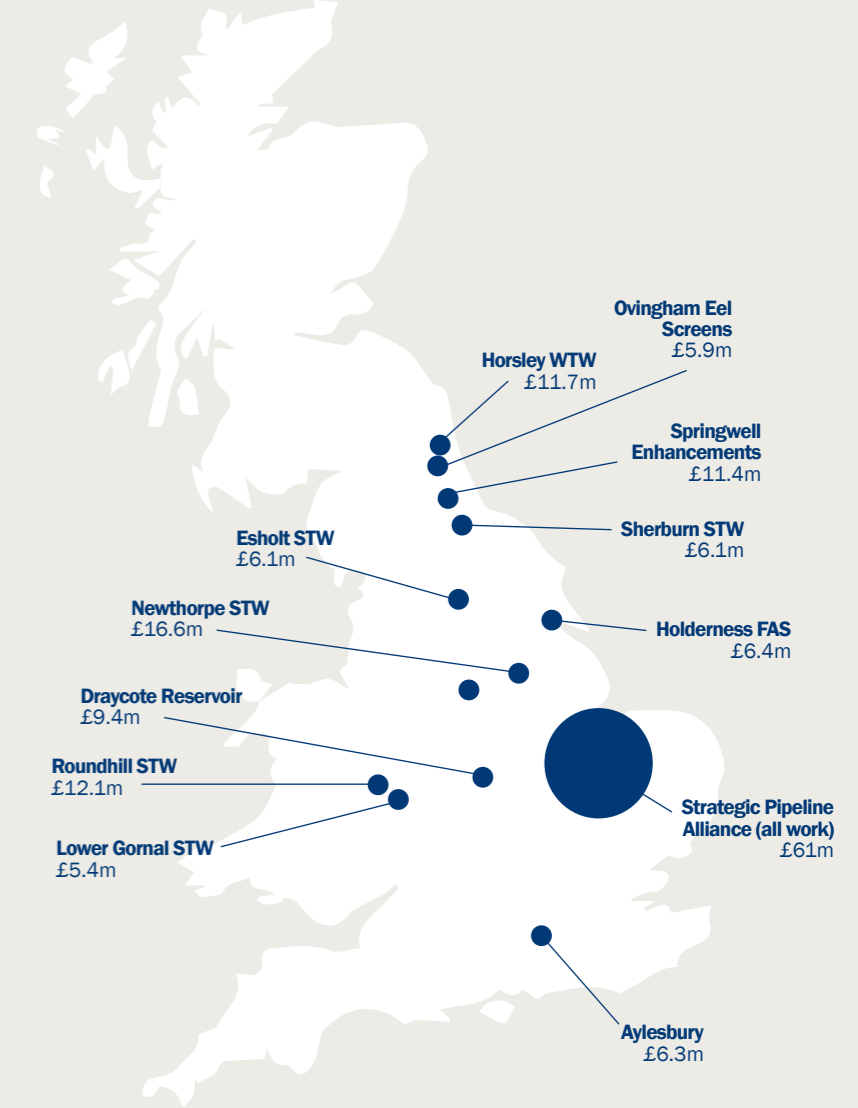
## Our profitability supported payment of a general employee bonus of 7.75%

In 2023 we returned much closer to the level of regional MMBC bonus we expect to deliver. Our profitability growth has outstripped the growth in our employment costs despite the combined impact of headcount growth and the award of inflation matching pay increases. During 2023 the general bonus paid to our employees totalled **£7.3m (2022: £5.0m)**.



## 13 projects delivered over £5m of revenue during 2023

This includes:



Note - this is only revenue delivered in 2023: full values are higher

## Investment in our people and in innovation

Investment in these areas is important and key to our future growth and success:

- Training, learning and development: **£4.8m (2022: £3.6m)**.
- Wellbeing and occupational health: **£0.3m (2022: £0.2m)**.
- Qualifying research and development expenditure within our projects: **£6.4m (2022: £4.8m)**.
- Our digital, excellence and sustainability teams: **£0.9m (2022: £0.6m)**.

## Even stronger prospects for 2024

At the time of writing our forecasts suggest we will exceed our 2024 budgeted revenue of £490m, meaning we are likely to become a £0.5 billion business as we close out AMP7 (the period 2020-2025).

Our recent recruitment and investments and our strong cash position mean we are well placed to ensure this growth is profitable and the future success can be shared by all.

Health and safety:

# A commitment to zero

There is nothing we care more about than making sure we all go home safe and well at the end of the working day. The standards and processes established by our Health & Safety Strategy have helped us to achieve industry leading health and safety performance.

Our commitment for health and safety remains undiminished. Preventing injuries and occupational ill-health will always be central to our Health & Safety Strategy.



Underpinning this is our Beyond Zero approach, which supports people to make positive decisions and take positive actions to keep themselves and each other safe should something unforeseeable happen.

2023 was a good year of health and safety performance with low injury rates achieved once again. This achievement is made even more significant when considering the number of new faces joining the business and quickly adopting our ways of working. Good

performance is not great performance, and 2023 saw incidents on our sites which brought some important learnings.

**Our Health & Safety Strategy**

The six elements of our Health & Safety Strategy underpin everything we do in pursuit of our commitment to prevent harm. 2023 saw the first revision of the Strategy in over five years as we made 'I Care' - our behaviour change programme - one of the elements.

**Targets (Key Goal)**

We know that the greatest performance in any element of our business is achieved by people working together. Fulfilling our commitment to preventing harm is no different. We require every colleague, whether directly employed, subcontractor or agency to be engaged with our commitment and seek opportunities to make positive interventions: making potentially unsafe conditions safe and engaging in talk safe discussions to promote safe behaviours.

100% engagement is our only company set target. To help encourage improved teamworking we require all our teams to set their own challenging targets which will deliver the company's commitment.

**Learning (Key Goal)**

To continue improving we need to keep learning from our experiences. Our best learnings come from positive interventions, where incidents are prevented by the actions

of our colleagues. In 2023 we recorded almost 54,000 positive interventions, a 40% increase from 2022.

We also share learning through our regular health, safety and environmental communications - talk safe/green prompts, learning alerts and toolbox talks - as well as our Beyond Zero campaigns.

In 2023 we developed a new campaign focused on lifting safely and reinforced the key elements of our previous 'Hands Clear' and 'Supporting Ankles' campaigns, the most frequently injured and most often badly injured body parts respectively. We also reminded colleagues of 'Plan It - Prove It - Protect It', our 2022 service avoidance campaign, which led to site teams preventing all gas and electric service strikes for over ten months.

To support continuous learning, all our colleagues complete an annual company health and safety induction. During 2023, we updated this to incorporate 'I Care' to ensure everyone understands how our successful behaviour change process builds on and is now integral to our Health & Safety Strategy.

**Communication (Key Goal)**

Effective two-way communication is key to preventing injuries and occupational ill health. One way we do this is through positive intervention reporting. In 2023 we saw an increase in reporting, demonstrating enhanced

engagement across our workforce. Improved availability of company smartphones and tablets and the use of new digital technology on sites is contributing to improved levels of reporting, making the processes quicker and easier for everyone as we strive for 100% engagement.

**Compliance (Key Behaviour)**

The Operational Health & Safety Standards introduced as part of our original strategy in 2008 remain vital in the successful delivery of our operations. To be effective, any standard, methodology, procedure, or safe system of work relies on compliance. Non-compliance increases the risk of injury - a factor we often see in incidents. In 2023, we utilised our Beyond Zero campaigns to reinforce the importance of compliance.

**Leadership (Key Behaviour)**

We require everyone to be a great health and safety leader - to set a good example for others, support compliance with our standards, share personal experiences and learning and engage in talk safe discussions. These individual safety responsibilities and

company expectations are set out in our Personal Safety Commitments.

**I Care (Key Behaviour)**

I Care is our behaviour change programme. It shows us how to build on the other Strategy elements to create a positive health and safety culture. It helps us understand behavioural drivers and how we can change our behaviour to respond positively and create safe habits so that we can stay safe even when unforeseen events happen.

**2024**

As well as continuing to embed 'I Care', 2024 will see us reinforce understanding of the other elements of our Health & Safety Strategy, including a focus on compliance with our 10 Golden Rules and Operational Health & Safety Standards.

2023 was another good year in health and safety terms, let's make 2024 better still.



2023 was a good year of health and safety performance with low injury rates achieved once again. This achievement is made even more significant when considering the number of new faces joining the business and quickly adopting our ways of working."

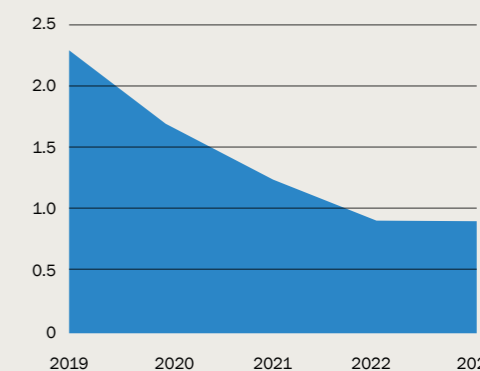
Jamie Fitton  
Director

## 2023 performance

In 2023, we ended the year with an all injury frequency rate (AIFR) of 0.92, our lowest ever recorded.

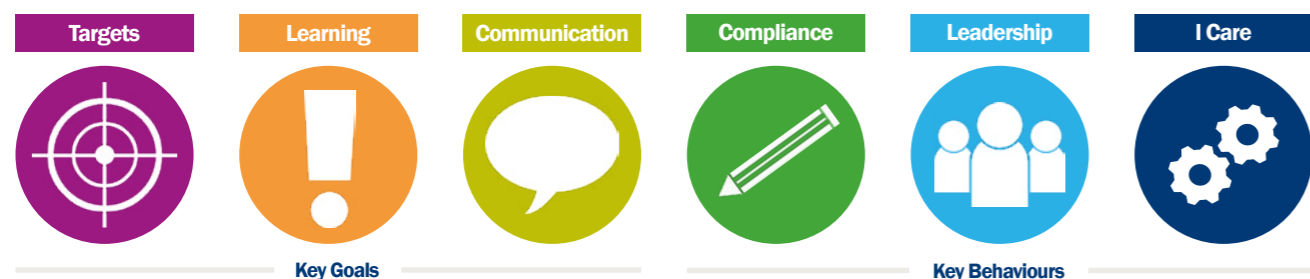
Category	2019	2020	2021	2022	2023
Hours worked	4,475,605	5,100,597	3,673,706	3,984,561	5,100,344
Positive Interventions (Talk Safes/Made Safes)	58,744	44,683	32,751	38,303	53,955
Serious Near Misses	44	37	25	18	11
First Aid Injuries	94	60	26	17	33
MTI/LTI	20	17	14	17	11
RIDDORs	4	7	6	4	6
AFR	0.08	0.14	0.16	0.14	0.09
All injury frequency rate (AIFR)	2.3	1.69	1.25	0.93	0.92
Total no. injuries	118	84	46	38	50

### All injury frequency rate (AIFR)



## Our Health & Safety Strategy

Our health and safety commitment is to achieve zero injuries and prevent occupational ill health.





# Our people: Enabling colleagues to be at their best

2023 was an exciting year from a people perspective. We introduced new programmes and initiatives to support employees to be at their best, as they deliver great projects with our clients.

### Welcome

Our employee journey starts with recruitment and on-boarding. This was a major growth area for us in 2023 as we increased the size of our workforce to ensure we can deliver an increasing workload. We welcomed 500 new colleagues into the business. This included growing our directly employed construction workforce by 35%, to over 700. 27 of these were skilled construction workers returning to life at JN Bentley, bringing back with them valuable experiences.

We have started to work with partners such as Buildforce to target ex-military recruitment events, recognising the valuable experience and unique skillset former armed forces personnel can bring to us.

Whether it's helping transition from military life – or just settle into a new role – our new staff on-boarding app is helping to guide new colleagues through those first weeks with us. This, coupled with the support of existing colleagues, is vastly improving our new joiner experience.

### A progressive workplace

Our recruitment drive was helped by continued efforts to change perceptions of the construction industry and demonstrate our standing as a progressive employer full of exciting opportunities.

Trials of agile working for site-based colleagues began, looking closely at how we maintain safe and timely delivery whilst building in flexibility through initiatives like new working patterns and



staggered start/finish times. Feedback has been positive, and trials continue.

Our focus on support for employee wellbeing and mental health didn't relent. Colleagues were able to access 100% confidential support from bodies such as Able Futures, an organisation providing mental health support for people at work. We had great engagement from the business to the stories shared by colleagues of their own personal experiences: thank you to you all for showing great bravery in doing so.

We improved our family-friendly policies to make our workplace more accessible and help colleagues maintain a healthy work-life balance. Improvements in 2023 included the introduction of carer's leave, and further enhancement to maternity and paternity leave. We also introduced a new benefits and wellbeing platform, and unlocked additional self-funded benefits for our construction workforce, including critical illness cover.

### Training and development

Training and development are vital elements of our employee offering. It was a record-breaking year for training,

as over 5,300 courses were arranged, equating to the completion of 7,300 employee training days – an investment of nearly £1.3m. Training ensures colleagues maintain the right skills, experience and tickets to deliver right first time on site. The delivery of more in-house practical training will be a key focus of 2024 after learning that we had secured Government funding to offer the Skills Bootcamp in water and construction training.

Colleagues continued to benefit from a host of development opportunities. Our first cohort of line managers completed our new Management Development Programme, 32 senior managers attended our leadership course, and the completion of formal development plans for our construction workforce led to 58 promotions. Over 6,400 connected conversations between managers and employees were recorded on our performance development platform, MMBC Connect. The conversations are future-focused and driven by agile goals to bring the best out of our people.



We continued to recognise those going above and beyond through our #BeRecognised programme. Over 350 people and teams received tokens of thanks during the year – for anything from delighting the client on site to driving the implementation of new systems. It's really important we celebrate success and say, "thank you".

### Forging a path

Learning and development is integral to our business, no less so than to those colleagues joining in early career positions. In 2023 we launched our new early careers development programme, kicking-off with an event attended by over 100 recent apprentice and graduate recruits, hosted by members of the Operational Board. The structured 12 month programme provides a framework for development, through in-person events and online skills training.

Our **Early Career Professionals (ECP)** network is an important community for those colleagues in the first ten years of their careers with us. We have 476 colleagues in the network; learn more about what they have been involved in on p14.

Our dedication to early careers was recognised with the award of gold membership of The 5% Club for the second year running. The 5% Club recognises organisations supporting early careers by having 5% or more of their workforce in 'earn and learn' roles. In 2023, we had over 10% of colleagues in such positions.

Over 160 colleagues continued their journeys through professional qualifications with a variety of prestigious bodies, including the Institution of Civil Engineers (ICE), the Institution of Engineering and Technology (IET) and the Institution of Occupational Safety and Health (IOSH).

### Listening

We pride ourselves on listening to colleagues and adapting our workplace to make it the best it can possibly be. One way we do this is through our employee engagement survey.



Whilst identifying some important areas in which there is work to do, 2023 results were strong, with the overall engagement score increasing. What was most pleasing was that the three main areas for action highlighted in our 2021/22 surveys all demonstrated improvement. This included 'reward and recognition', 'employer of choice' and 'talent development'.

The results of the survey have helped to shape the people agenda for 2024 and beyond. We know this period will be hugely exciting, busy and challenging as our people continue to deliver fantastic outcomes for our clients and their customers – doing so in an environment in which they are happy and able to thrive.



*JJ*  
**Judith Jeffery**  
Director

**We welcomed 500 new colleagues into the business in 2023. This included growing our directly employed construction workforce by 35% - 27 of whom were skilled construction workers returning to life at JN Bentley."**

**Judith Jeffery**  
Director

# Sustainability and social outcomes

Our approach is built upon six pillars that span both social and environmental elements, providing a focus for how we, in collaboration with our clients and supply chain, improve society, deliver sustainable solutions, invest in our people and support the communities we operate in.

## Environmental enhancement

Engagement is a key focus area; in 2023, we maintained high levels of engagement with over 9,400 positive interventions recorded and several 'talk green' prompts shared company-wide, designed to support site briefings and discussions on key topics.

We have continued to grow our capability in delivering nature-based solutions, whilst also supporting our clients in meeting requirements and aspirations to deliver biodiversity net gain (BNG). In 2023 we expanded our team of ecologists and environmental specialists and worked collaboratively with landscape contractors to maximise BNG achievement.



JN Bentley was proud to be awarded a silver medal sustainability rating from EcoVadis, placing us in the top 25% of companies assessed.



## Preserving resources

We strive to preserve resources by reducing water consumption and promoting water efficiency, minimizing waste and diverting over 95% of all our waste from landfill, and using energy efficiently where we can.

Working closely with our supply chain partners and office suppliers we have facilitated the reduction of single-use plastics across our operations using sustainable alternatives where viable.

In project delivery, our focus is on adopting circular economy principles: reusing or refurbishing existing assets and recovering and sharing materials and products for onward reuse. We optimise designs as much as possible, using standardisation to minimise waste and reduce construction impacts.

2,083 plastic milk bottles avoided by switching to glass bottles

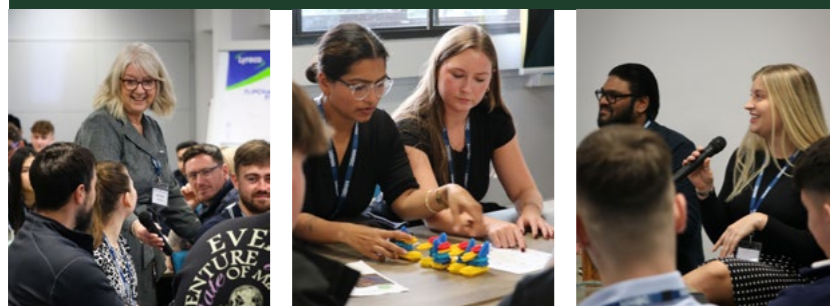
In 2023 we estimate to have saved 715 plastic milk bottles by switching to glass in our Skipton office in May. For a whole year we estimate to save 1,117 plastic bottles. An additional 1,367 plastic bottles are estimated to have been saved by switching from pint milk bottles to 1L bottles in our Shifnal office.

Whilst wider sustainability considerations for the switch to glass continue to be under review, that's a total of 2,083 plastic bottles avoided in 2023, a 45% reduction on what could have been ordered.



## People

Over 100 new graduates and apprentices attended our Early Careers Development Programme launch, which provides a structured framework for career development through a series of in-person events and online skills training.



We held two of our first ever gender forums in Shifnal and Wales, where 54 employees gathered to share their experiences and give feedback on ways we can improve our organisation for women.

Our 55 wellbeing champions also supported 12 health and wellbeing campaigns through the year, from Mental Health Awareness Week to Talk Money Week - continuing to deliver our wellbeing approach: creating a culture where our people are happy, healthy and safe.



## Procurement with purpose

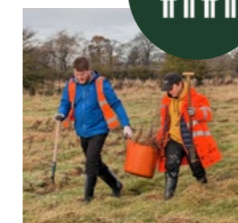
Small and medium-sized enterprises (SMEs) currently make up over two-thirds of our supply chain. In 2023 we achieved our target of over 70% spend with SMEs. Our 'source local strategy' also supports local businesses and communities. In 2023 we set up dedicated working groups with key supply chain partners to drive forward key objectives around how we deliver social value and carbon reduction, and support a circular economy.



At Witches Oak, strong collaboration with our suppliers and subcontractors resulted in a cabin donation used to support educational and community engagement, equip local school children with PPE and educational resources, and - with the help of our STEM team and Severn Trent - run an activity centre for the duration of the project. [Learn more about Witches Oak on p21.](#)

## Supporting society

Over 110 individual CSR (corporate social responsibility) activities were recorded throughout 2023, totalling over 1,600 hours, including environmental volunteering, fundraising activities and community projects.



In collaboration with Leeds City Council, colleagues volunteered 36 hours of tree planting to a woodland scheme, supporting biodiversity and habitat creation.



At the ICE Midlands Awards, we won the Communication Award for our project with Severn Trent at Sutherland Road. The team demonstrated excellence in local community engagement, working tirelessly to minimise disruption to our client's customers during the delivery of a complex flood alleviation scheme in a busy residential area.



At Springwell Reservoir, in the North East, the team collected over 600 used crisp packets to support the charity Nite Light, who then recycled them into sleeping bags for the homeless.

## Carbon reduction

We are committed to achieving net zero emissions by 2040. Our targets (including several near-term targets to support our long-term net zero ambition) have been validated by the Science Based Targets initiative (SBTi) in line with their Corporate Net Zero Standard. In 2023, we shared our regional carbon reduction plan, outlining how we will work towards achieving our targets.

During our first region-wide challenge led innovation campaign - which focused on low carbon innovations - many great ideas were submitted for how we can use the principles of circular economy to lower our carbon impact. Our 'Low Carbon Solutions in Design' group has been actively transforming our approach to engineering best value solutions for our clients - embedding a low carbon mindset into decision-making.



Adopting the latest technology and telemetry, our standard site set up project reduces energy consumption by utilising more energy-efficient EPC A rated site cabins, plus batteries and solar panels alongside diesel generators to reduce fuel usage.



We collaborated with supply chain partners and Yorkshire Water to pioneer innovative 3D concrete printing at Esholt STW. Identifying carbon hotspots using our industry-leading digital solutions platform, Moata Carbon Portal, saved 300t of carbon (67%).

A winning result: the team took home the ICE Yorkshire and Humber Net Zero Award!

# Digital delivery

Our digital delivery approach centres on four key themes:

## Optimisation

## Transformation

## Digital literacy

## Information

With an innovation process moving from discover to incubate, upscale and then consolidate, we embed new digital tools and processes that add value to the way we work. These enable us to utilise standardised systems, processes, and the power of data to generate consistent value, ensuring we meet our clients' challenges and remain at the forefront of digital transformation across the sectors in which we work.

### Moata

We utilise our industry leading digital solutions platform, Moata, to deliver better solutions. We used Moata Geospatial and

Moata Inspect on our Yorkshire Water Infrastructure framework to improve the efficiency of data collection and data visualisation, allowing real-time analysis to be undertaken - with resulting savings of over 800 hours of designer time.

We used the Moata Carbon Portal at award-winning **Embsay WTW** to establish a carbon baseline, inform decision making and reduce carbon hotspots. We achieved a 78% reduction in embodied carbon.



### Intelligent machines/digital plant

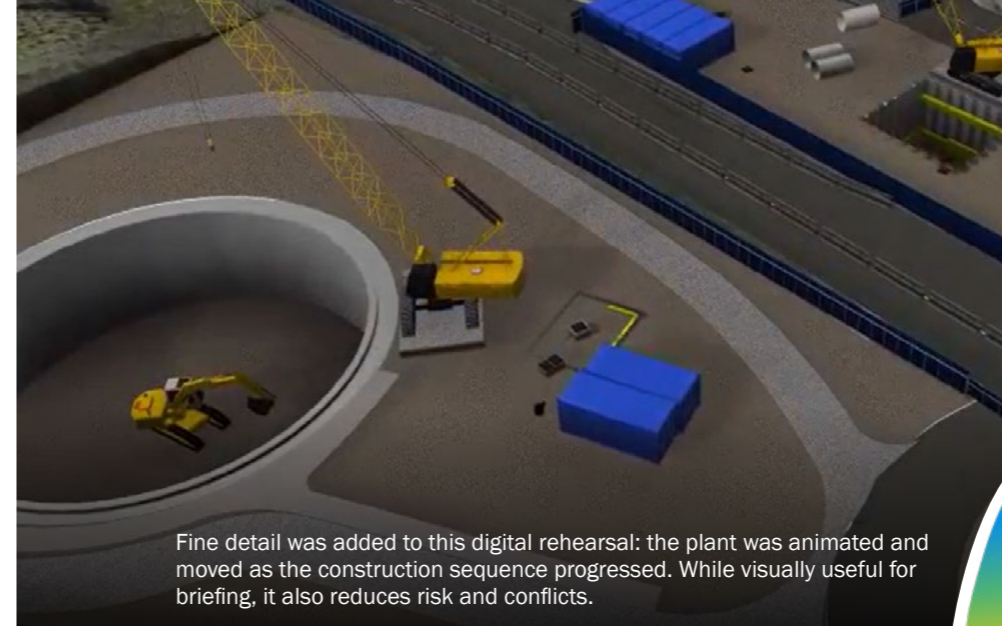
Investment in intelligent machines and digital plant is increasing time and resource efficiencies. At Springwell (p32), intelligent excavators achieved a 30% increase in productivity whilst optimising fuel usage. With the machines working from an uploaded design model, we can avoid over digging and reduce waste.

Utilising this data we are developing dashboards that empowers data-driven decisions, transforming behaviours and fostering a 'digital mindset' on site.



### Digital construction - Laser scanning

We're developing in-house Laser Scanning (LiDAR) capability. LiDAR enables rapid 3D data collection that ensures the use of accurate design data in 3D models, supporting right first time delivery. Handheld laser scanning has been used at water treatment works to survey temporary works and plan critical connections, and pictured is scanning technology that gives us an instant detailed survey of an asset on a tablet.



Fine detail was added to this digital rehearsal: the plant was animated and moved as the construction sequence progressed. While visually useful for briefing, it also reduces risk and conflicts.

### Information management

Good information management underpins our digital approach. As part of our drive to become an insight-driven business, we continued to upskill our teams through data literacy courses and training, aligned to our ISO 19650 certification.



Adopting ISO 19650 for document management and utilising smart data collection solutions within Anglian Water's Strategic Pipeline Alliance (SPA) enabled processes to be streamlined, collaboration improved and cost savings realised.

“SPA was a finalist in two categories at the NCE TechFest Awards. Our flood defence scheme in the centre of Derby (p20) was also cited for digital prowess in being named Environmental Project of the Year at the British Construction Industry Awards. Judges were, “Impressed with levels of innovation, such as using augmented reality...it was clear this contributed to excellent delivery.”

### Site connectivity

Keeping our colleagues and sites well connected means we can deliver project more efficiently - making sure the right people have the right information at the right time.

In 2023 we rolled out over 100 tablets to site teams, enabling them to effectively carry out digital inspection and test records, record health, safety and environmental positive

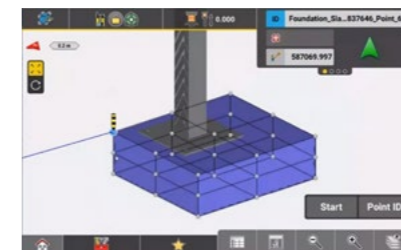
interventions and access our library of digital tools that support project design and delivery.

We'll continue to build on this in 2024, including providing improved remote e-learning for our teams and utilising our own capabilities to develop in-house application solutions.

### Digital construction

We continue to embed digital construction tools to drive collaborative and efficient ways of working:

**Digital rehearsal:** We are continuing to reap the benefits of digital rehearsals on projects to facilitate better planning. At Embsay WTW, Synchro 4D Pro was used to create a digital rehearsal during the investigation and tender stage to better understand sequencing on an extremely tight site. Outputs facilitated communication between the tendering team and supply chain, leading to improved project analysis and construction methodology.



**Construction from models:** Our project at Wark STW is one of the first to be delivered 'model only' with fewer drawings than a normal project. To enable the setting out process, the 3D model is issued to the engineer using the latest cloud technology and equipment from Leica Geosystems, saving time compared to waiting for drawings to be issued.

# AI

We're trialling artificial intelligence (AI) tools and software that have the potential to streamline our processes and drive improvements in key areas of our business.



Microsoft Copilot is making us more efficient in writing documents, recording notes and actions from meetings, and finding information across our business more quickly.

We're trialling software that helps to predict safety

performance to inform better decision making by identifying areas of risk. We're also exploring the use of an AI tool to validate the quality of our risk assessments and method statements.

**“AI is no longer in the realms of science fiction. The tools are here now. Our clients are starting to ask us how we're deploying advanced analytics and AI-powered solutions to deliver better projects and better outcomes for their customers.”**

Jon Walker  
Head of Digital Delivery





# Technical excellence

## Improving what we deliver and how we deliver it

**Technical excellence means improving what we deliver and how we deliver it. It means connecting our people, innovating with purpose, fostering the technical skills of our people and celebrating what we do best: delivering projects for our clients and for society.**

### Technical practices

Our technical practices are networks that bring together colleagues via common areas of technical and professional interest. Our practices cover pipelines, water and wastewater treatment, mechanical engineering, BIM, environment and temporary works (plus lots more!). As the core of our technical knowledge, they help us to deliver quality solutions in a cost and efficient way. Our practice networks now boast 704 members from across our business.

### Early Career Professionals

2023 was another great year for our Early Careers Professionals (ECP) network. Through a variety of initiatives and events, we continued to grow and strengthen our regional network. This included webinars and workshops - such as our popular 'For ECPs, by ECPs' series, STEM activity, group site visits, and our second annual ECP Day.

With interactive workshops, a director Q&A session and other activities, ECP Day was an opportunity for over 60 ECPs to network with their peers and collaborate on topics important to the business - from digital delivery to opportunities and risks facing the industry.

### Innovation

We pride ourselves in our innovative approach

to engineering and construction and in 2023 continued to innovate across our projects.

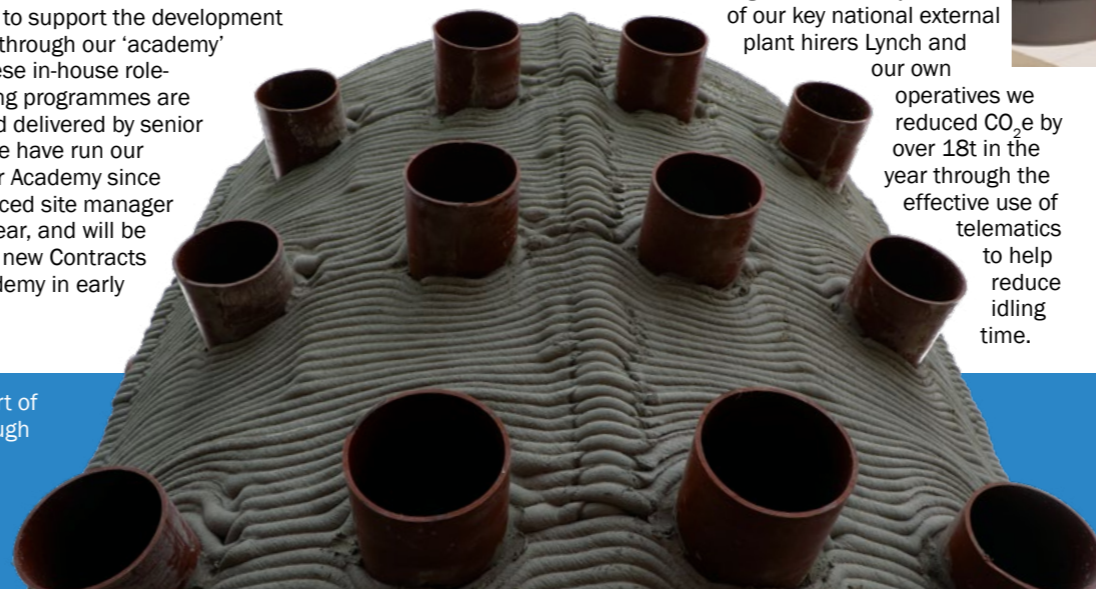
We continued to capitalise on our Innovation Framework to help maximise the value of our brilliant innovations and innovators - including examples of 3D concrete printing at both



Project MUNIO (p20) and Esholt (p27), pictured below. We launched our first internal innovation campaign to hear colleague ideas on using circular economy principles to help meet our net zero commitments. And to support our activity in this space we appointed our new Innovation ECP Lead.

### Academies

We continued to support the development of our people through our 'academy' approach. These in-house role-specific training programmes are developed and delivered by senior colleagues. We have run our Project Leader Academy since 2020, introduced site manager training this year, and will be launching our new Contracts Manager Academy in early 2024.



Working collaboratively with one of our key national external plant hirers Lynch and our own operatives we reduced CO<sub>2</sub>e by over 18t in the year through the effective use of telematics to help reduce idling time.

# Supply chain

**With upward of 100 operational sites at any one time across the UK, we rely on our dedicated supply chain to bring added value to our business. From materials to plant to subcontractors, our approach relies on building long-term mutually beneficial relationships and 'sourcing local' whenever we can.**

### Capacity and resilience

Several recent geopolitical events have seen supply chains stretched to their limits; we are proud of how we have worked with our strategic supply chain to protect against significant delays to our projects. Looking forward, supply chain resilience is at the top of both our own and our clients' agendas and we will continue the positive work already undertaken to ensure we continue to deliver in sectors that are seeing significant investment but yet have very specialist and niche supply chains.

**Opportunities and risks** | the Bentley Price Index (BPI) - our document tracking inflation - continued to prove useful both internally and for clients.

### Low carbon

We have worked with key suppliers in the ready mix-concrete, precast concrete and AI-enhanced concrete sensor markets to pilot different products, methods of construction and technologies that will all help the business and our clients reduce CO<sub>2</sub>e associated with the concrete structures we build.

### Improving safety

Given subcontractors play an integral role on site, we continued to roll-out important 'I Care' health and safety sessions with their teams. The aim is to increase safety engagement and reduce injuries. The results have been positive, with the number of positive interventions made by our subcontractor colleagues increasing as a result.

Our new **standardised sustainable site setup** - developed closely with our site accommodation suppliers Nixon and Wernick - was a finalist at the **NCE TechFest Awards** for Best Use of Technology: Carbon Reduction. 'Procurement with purpose' is one of core pillars of sustainability, [read more on p13](#).

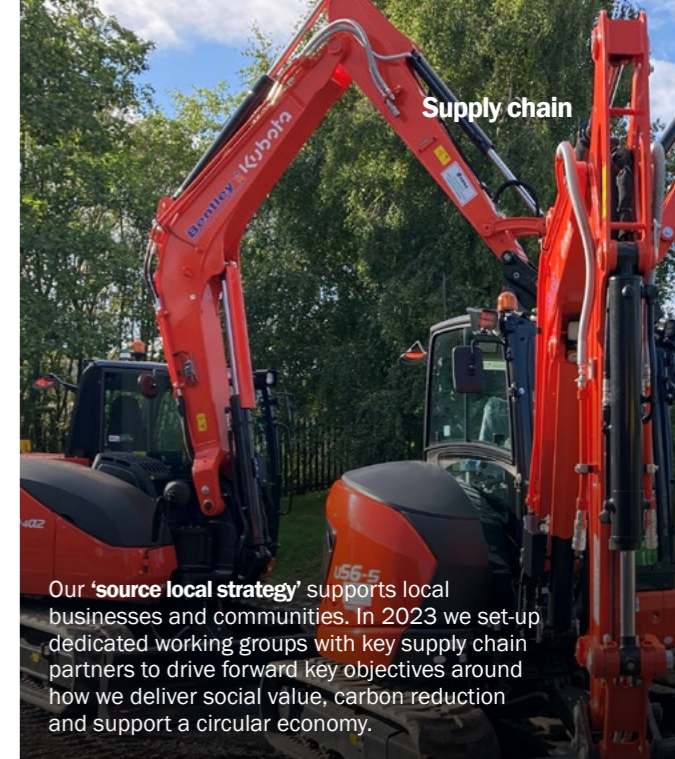
Close collaboration between procurement and our newly formed **DfMA**



team has already yielded success, improving safety and reducing programme, cost, and risk of rework. Standard products such as chemical dosing assembly and radial settlement tanks have been created with a procurement plan strategy in mind, rethinking the

way we procure and install elements such as the launder and the hopper, and identifying where new commercial agreements will be necessary in AMP8.

Collaboration between the teams has been key to bringing products from both pressure and gravity system suppliers into our compenent library. **Learn more about DfMA and standardisation on p29.**



Our **'source local strategy'** supports local businesses and communities. In 2023 we set-up dedicated working groups with key supply chain partners to drive forward key objectives around how we deliver social value, carbon reduction and support a circular economy.

### Internal plant

We pride ourselves on our internal plant and fleet of vans and vehicles. In 2023 we invested over £14m in this area, including 68 excavators and 98 vans.

A more strategic relationship has been formed with Hilti, and we started to roll out their new electric cordless Nuron range. This provides a single cordless tool platform with improved performance, safety and user comfort and provides fleet management features to actively support our operatives.

Trials of electric vehicles continued as essential supporting infrastructure improved; we plan to buy our first electric vans in 2024.

We continued to invest in Komatsu 'intelligent' excavators and dozers - machines that work directly from design data to improve accuracy and quality and reduce waste. These have now become our 'default' machines for all new dozers and excavators 21t and above.



We formed a dedicated digital plant team to build on the success of forerunners such as the intelligent excavators. The team developed the first telematics dashboard that presents data from company-owned plant to identify areas where efficiencies can be made and introduced smart fuel bowsers with access controls to monitor fuel use.

### In numbers

**£103m** spent

**£8m** savings delivered

**10,000** orders raised

**70%** of supply chain are SMEs



**Excellence Fortnight** | Technical excellence was showcased as part of Mott MacDonald's Excellence Fortnight. Themed 'Learning - through formal training and development, social interactions and project delivery', we shared success stories from projects including Newthorpe (p22) and Upper Carno Dam and led knowledge shares on topics such as digital planning of temporary works, and efficient design of water retaining structures.

Our clients:

# An exciting and record-breaking year

## Case studies

Check out some of our best, most innovative and important projects from 2023 over the page ►



We operate through three primary delivery vehicles, taking a 'right company for the opportunity' approach. **JN Bentley** provides civil engineering contracting services, together with mechanical and electrical expertise. Celebrating its 25th birthday in 2024, **Mott MacDonald Bentley (MMB)** offers fully integrated civil engineering feasibility, design, construction, and commissioning services. **JBA Bentley** – now a decade old – delivers fully integrated water and environmental engineering, feasibility, design, construction and commissioning services, with a focus on low carbon solutions.



### 2023 was an exciting and record-breaking year for us, dominated by significant growth across the business to meet the needs of our clients.

The majority of this growth was seen across our water sector clients, with investment ramping up towards the end of AMP7 and as we transition into AMP8. In addition, we maintained focus on our non-water business unit, ensuring that it continues to add project diversity and growth across the environmental, energy, industrial and highway sectors to maintain broad employee and organisational skillsets.

We strengthened our position for AMP8 with the successful roll-over of several framework agreements, as well as securing long-term places on Northumbrian Water's Living Water Enterprise and South West Water's Non-infrastructure Framework - the latter providing us with the opportunity to extend our UK coverage and establish a local presence founded on our culture and long-standing expertise in the delivery of water projects. We now deliver for eight of the UK's largest water and wastewater companies, providing us with the unique opportunity to share best practice and learnings across the water sector.

The fact that we have been able to extend our relationships with existing clients as well as add to them is testament to the great work that our teams collaboratively delivered over the year.

As part of Anglian Water's Strategic Pipeline Alliance (SPA) we continue to be a key partner in delivering one of the largest infrastructure projects in the UK; at Esholt Sewage Treatment Works (STW) we worked with Yorkshire Water and Hyperion Robotics to 3D print concrete drawpit structures, reducing carbon and construction time; at Strongford STW we commenced the construction of the world's first net neutral carbon wastewater treatment works with Severn Trent, supported by the Ofwat Innovation Fund; at Llyn Celyn we commenced the construction of what will be one of the UK's largest spillways; and at Holderness our in-channel 12m<sup>3</sup>/s pump station became operational to reduce the risk of flooding to homes and businesses in Hull.

### Rising to the challenge

One of the biggest challenges facing the sectors within which we operate is the finite pool of skilled resource.

Our reputation as a leading design-and-build organisation that provides social value served us well in attracting new people to the team - with a headcount growth in 2023 of over 500, spread across our construction, design and support teams. In addition, we experienced our lowest churn in over a decade, resulting in retained skills and knowledge – critical during periods of growth.

In line with our long-standing commitment to invest in early careers, in October we launched our first-ever Early Careers Development Programme, attended by over 100 apprentices and graduates who have recently joined the business. Supporting the learning and development of our people is really important to us, as we know that when they are given the tools to achieve their full potential, they are at the heart of successful project delivery and are an asset to not only our organisation but also to our clients.



We recognise that headcount is not the only means of rising to the resource challenge. Early in 2023 we formed a central design for manufacture and assembly (DfMA) and standardisation team to accelerate the creation of reusable designs, and drive efficiency in repeatable solutions. The team has initially been engaged in developing standard solutions and parametric models to support the efficient delivery of our storm overflow programme with Yorkshire Water.

Continued high levels of inflation raised many of our client's affordability challenges. Recognising that we are part of the solution, there were many examples throughout 2023 where we delivered affordable solutions through:

- thinking innovatively to deliver the same outcome for less;
- the use of digital tools to optimise



The fact that we have been able to extend our relationships with existing clients as well as

add to them is testament to the great work that our teams collaboratively delivered over the year.

Ian Bester  
Director

- planning and increase efficiency;
- adopting the principles of our Quality, Cost & Efficiency Strategy;
- linking into our wider Mott MacDonald Global Practice Groups for specialist knowledge and learnings.

### Industry recognition

People deliver projects, so it's always nice for our teams to be recognised, and they did just that in 2023, securing awards across a range of categories, from external industry awards to client and supplier awards. We shared success with our clients at regional ICE and CECA ceremonies, but also nationally where we picked up British Construction Industry Awards for Environmental Project of the Year for the design and construction of a flood defence pumping station for Derby City Council; and for SPA, which was named Carbon Net Zero Initiative of the Year.

### The next 12 months

We've got a strong order book, so it's going to be a busy but rewarding year ahead. We hope to add to this with success on further water and non-water opportunities.

Strong collaborative relationships with our clients, framework partners, and the wider supply chain will be central to our successful delivery. Going above and beyond – whether that's engaging local communities and delivering positive social outcomes, achieving cost, carbon and programme savings, or proposing innovative solutions – will always play a key part in our purpose, and we hope to satisfy all.



*IB*

Ian Bester  
Director

**Project:** Project MUNIO  
**Client:** Derby City Council  
**Location:** Derby  
**Status:** Complete 2023

# Put to the test

Derby has historically suffered severe flooding. The £8m project, delivered by JBA Bentley on behalf of Derby City Council, bolsters the city's defences and involved the installation of two hydraulic lock gates, sheet piled river walls, a fish refuge area and a new pumping station capable of passing forward flows of 4,500 litres per second.

Cutting-edge software enabled the design and delivery of the scheme to be progressed simultaneously to meet a challenging 15-month programme. Miro digital planning software enabled stakeholders to collaborate remotely and ensure all key tasks and milestones were understood and achieved. Live 3D digital modelling combined with 4D Synchro planning software brought the programme to life, integrating the 3D digital model and works programme to produce a sequence animation of structures and assets being installed, enabling effective planning and right first-time installation. Augmented reality (AR) software was used on site to visualise and overlay design features, assisting with planning site operations and communicating risks.

Carbon modelling tools and programme scrutiny identified significant carbon and programme savings. Temporary works were incorporated into the permanent works structure, rationalising the use of structural concrete. 3D printed concrete was used for semi structural applications including ground bearing access stairs, sheet pile cladding and capping panels. Printed and cured in a factory-controlled environment, these elements were delivered ready for immediate installation saving time and reducing waste, carbon and safety risks.

High-efficiency pump motors coupled with variable frequency drives and intelligent control ensures that pump operation is optimised for all flow conditions. The enclosures were manufactured off-site in factory conditions and the generator unit, support structure, air and exhaust systems, and ancillary power management equipment fully assembled, tested and pre-commissioned before delivery to site, reducing on-site electrical works and interface risks, maximising control of safety and quality.

The inclusion of a fish refuge provides shelter for aquatic life and enhanced habitat for the reach. The surrounding parkland was re-landscaped, including new access pathways and 75 new trees.



Project MUNIO was named Environmental Project of the Year at the 2023 BCIA Awards

The project demonstrated the use of innovative project management techniques, value engineered solutions as well as embracing the benefits of off-site modern methods of construction to deliver the project on time, to budget and with zero safety or environmental incidents. It provides heightened flood protection to over 250 commercial properties and businesses, protects critical infrastructure, with biodiversity net gain and environmental enhancements saving 70 tCO<sub>2</sub>e.



# Nature positive!

**Project:** Witches Oak Green Recovery  
**Client:** Severn Trent  
**Location:** Derbyshire  
**Status:** On-going



Witches Oak is a ground-breaking scheme bringing an abandoned water resource back into use to improve the resilience of drinking water supplies during future droughts.

Witches Oak is a series of gravel pit lakes in Shardlow, near Derby, alongside the River Trent. Having been out of use for more than 20 years, we are working closely with Severn Trent to recommission existing infrastructure and increase raw water supplies to provide up to 93 ML/day – and constructing floating treatment wetlands as part of a low carbon, nature-based solution.

The floating reed beds launched on the existing lakes provide the first stage of the water treatment process. The wetlands use naturally occurring biological processes to contain and treat ammonia, suspended solids, and trace metals; without this natural preliminary treatment, the lakes / river water would require significant additional treatment via traditional methods.

Once installed, the wetlands typically require no watering or fertilisation and are resilient to changes in load and fluctuations in the water level. Their floating ecosystem mimics elements of self-sustaining, naturally occurring riparian wetlands: the root mass provides the large surface area needed by the microbial communities to remove pollutants.

design and operational teams – plus environmental specialists from across Mott MacDonald - led to a successful pilot installation of three wetlands in 2022, which we followed with a further 28 in summer 2023. We produced a bespoke management plan to protect the high ecological value of the site, including the successful management of numerous invasive species and prevention of the spread of Himalayan balsam.

This is the first time in the UK that wetlands have been used for operational water pre-treatment on this scale and in the real world, but studies show that, on average, these floating wetlands can remove about 40-60% of both total nitrogen and total suspended solids (particles >2 microns), helping to considerably reduce the amount of energy and chemicals used compared to the traditional water treatment process.

By restoring natural functions to these lake ecosystems, we are also promoting biodiversity recovery and contributing to an enhanced ecosystem. Planted vegetation is a haven for wildlife and provides habitat for fish, eels, and other aquatic species. Positive social outcomes and community engagement were also important. A successful visit from a local Guide group was followed by a pop-up engagement centre used by local community groups to promote the scheme and its positive impact on sustainability.

“Through close collaboration between stakeholders, we are delivering an innovative ‘green recovery’ project which strives to leave positive biodiversity net gain benefits and a strong social outcomes legacy for the local community.”

Olivia Rowe  
Project Leader

Close collaboration between the



As water levels rose in the autumn of 2023, the defences were immediately put to the test:

“The new, award-winning Mill Fleam Pumping Station saved over 40 properties, working exactly as designed after being used for the first time.”

Councillor Baggy Shanker  
Derby City Council

# Double up

**Project:** Newthorpe Sewage Treatment Works  
**Client:** Severn Trent  
**Location:** Nottingham  
**Status:** On-going

**We are transforming Newthorpe Sewage Treatment Works (STW), making it capable of treating double its current flow – and doing so on a similar size footprint to the existing asset.**

To improve the quality of the effluent to the River Erewash and remove phosphorus from the environment, we are delivering a major project to transfer flow to full treatment (FFT) from nearby Heanor Milnhay STW to Newthorpe for combined treatment, accommodating a population equivalent of 100,000.

The extension includes a new inlet works to treat the flows transferred from Heanor Milnhay; a combined chamber with a high flow overflow; anaerobic and anoxic tanks with a total capacity of 5,000m<sup>3</sup>; a four-lane activated sludge plant (ASP); three 33m dia. final settlement tanks; and mixed media tertiary filtration technology.

At the heart of our solution is an enhanced biological phosphorus removal (EBPR) plant. Opting for this efficient technology over a traditional ASP reduces the need for high volumes of chemical dosing in the future, making it a more environmentally friendly, lower-carbon way of treating phosphorus.

This is one of several elements of the build that have implemented the ideology of PAS 2080, the carbon hierarchy to deliver a 'build better' solution. This includes:

- **Build nothing:** Including challenged

the scope and designed out entirely a requirement for SAS mixing tanks.

- **Build less:** Such as retaining existing civil structures associated with the inlet works, saving over 250 tCO<sub>2</sub>e.
- **Build smart:** Over 2000m<sup>3</sup> of concrete and in turn 500 tCO<sub>2</sub>e have been saved on materials alone through the redesign of the EBPR structure to have tapered walls and base slab.
- **Build efficiently:** Over 100,000m<sup>3</sup> of excavated material has been moved with the help of smart construction plant, leading to efficiencies in planning and plant movement and avoiding double handling of material. This is being reused as part of a new planned landscaped bund, delivering biodiversity net gain through the creation of a new wildlife habitat with trees and wildflower meadows.

Significant progress was made on site in 2023, including the construction of three final settlement tanks and a 90m x 42m four lane EBPR ASP alongside the anoxic and anaerobic tanks – some of the largest new structures as part of this project. Once complete, the expansion will make Newthorpe one of the largest enhanced bio-phosphorus treatment sites in the region, achieving a tightened permit of 0.2 mg/l while minimising the use of chemicals in its process.



**200m of the new pipeline into site passes beneath the river and canal; we constructed this using trenchless directional drilling, working closely with our supply chain."**

**Matt Starling**  
 General Construction Operative

# Production mindset

**Project:** Strategic Pipeline Alliance | **Client:** Anglian Water | **Location:** East of England | **Status:** On-going

**The end of 2023 marked another challenging yet successful year for the Strategic Pipeline Alliance, an alliance in which MMB is one of a number of key partners alongside Anglian Water.**

With the East of England feeling the effects of a long-term rainfall together with a growing population, Anglian Water have responded to the challenge of building resilience into its customers' water supplies by forming the Strategic Pipeline Alliance – SPA – to deliver one of the largest infrastructure projects currently on-going in the UK. A new network of nearly 500km of interconnecting pipelines – plus a significant programme of new non-infrastructure assets and upgrades of existing ones – will shift surplus water from the north of the region to the south and east, where drought conditions are more prevalent.

Since 2021, MMB has been delivering several sections of pipeline on SPA, and by 2025 will have laid 120km across the region. In 2023 alone we laid 29km of steel pipe, as much as in the previous two years combined as activity on site accelerated. Here's a summary from 2023:

**Elisham to Lincoln (E2L)** – the most northerly section on SPA, nearly 15km of pipework was laid on E2L in 2023.

**Lincoln to Grantham (L2G)** – this 35km stretch is now complete ahead of commissioning.

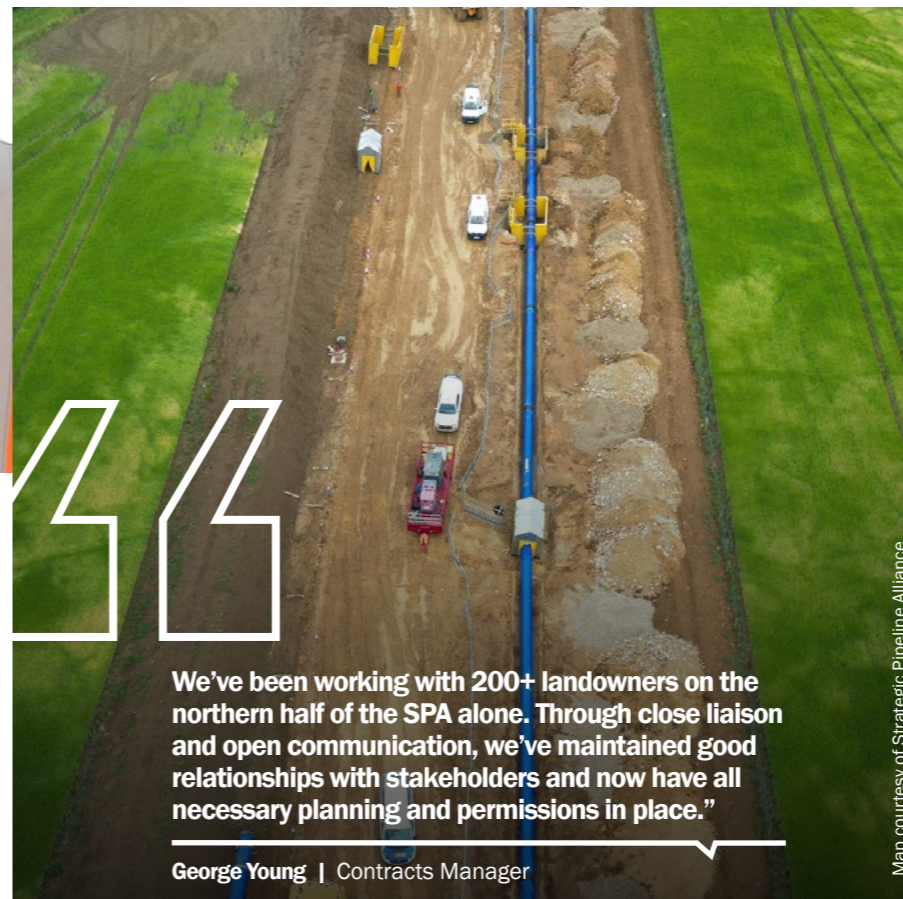
**Grantham to Peterborough (G2P)** – close to 15km of pipework was laid on G2P, 40% of its total length. Reinstatement also began.

**Etton to Bexwell (E2B)** – preparation was made to delivering this challenging 50km stretch of 800mm steel pipeline ahead of a 2024 start. It includes 27 directional drill crossings and marshy ground conditions through the Fens.

**Norwich to Wyndham (N2W)** – this 12.5km HDPE pipeline crossing a railway line and a major A-road is complete.

Our team has optimised concept designs, using digital tools from our Moata suite to supercharge carbon efficiencies totalling 200,000 tCO<sub>2</sub>e. This includes reducing total pipeline length by 22%; re-purposing 67km of existing pipeline; and cutting new water storage requirements by 65%. Efforts have been recognised as 'industry leading': the British Construction Industry Awards presented SPA with the Carbon Net Zero Initiative award in 2023.

**All the steel required for the rest of the build is now on UK soil as we look forward to extremely busy and productive years to come.**



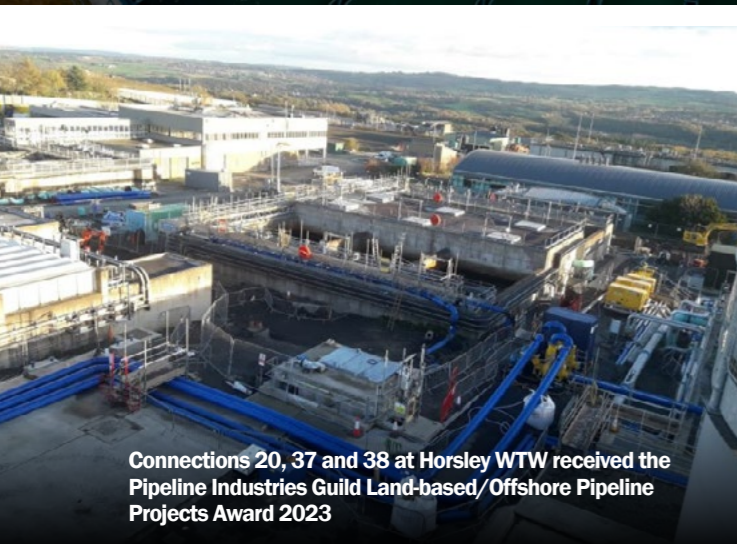
**"We've been working with 200+ landowners on the northern half of the SPA alone. Through close liaison and open communication, we've maintained good relationships with stakeholders and now have all necessary planning and permissions in place."**

**George Young** | Contracts Manager



# Clean water

One of the key responsibilities of our clients in the regulated UK water sector is to ensure the supply of potable water to their customers. Our role is to provide great engineering solutions that contribute to the clean water treatment and supply process – from efficient upgrades of existing works to brand-new state-of-the-art assets.



Connections 20, 37 and 38 at Horsley WTW received the Pipeline Industries Guild Land-based/Offshore Pipeline Projects Award 2023

## North Tyneside resilience

**Project:** Horsley Water Treatment Works  
**Client:** Northumbrian Water  
**Location:** Tyneside

We are delivering a multi-million-pound upgrade to Horsley Water Treatment Works to bring resilience to Tyneside's water supply. Works include the completion and commissioning of a new Actiflo clarification process, six rapid gravity filters, de-alkalinity, and run-to-waste (RTW) systems.

One of the largest schemes we have ever delivered with Northumbrian Water, the project requires great collaboration between our teams - and supply chain - to meet challenging targets and fast-track emergency works to increase water supply into the network. Managing major shutdowns for investigative and construction works, both on mains connections and structural assets, was critical to the process.

2023 saw good progress made on site, including the handover of the Actiflo system to our client's operations, installation of 1.1km RTW pipework, completion of steelwork repairs to the rapid gravity filters, upgrades to the IDC mixer works, installation of a new inlet control valve and completion of de-alkalinity works.

## The most cost-effective water treatment works to operate in the North West

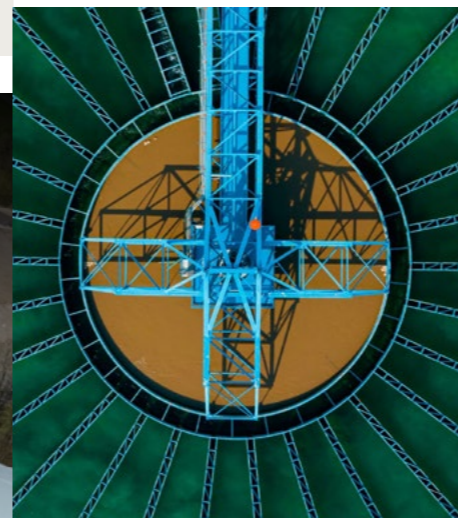
**Project:** North West Water Treatment Works  
**Client:** United Utilities  
**Location:** North West England

We have completed major upgrades to a United Utilities water treatment works, maximising its output and reducing the average 'unit cost to treat' to make it the most cost-effective water treatment asset in the area.

The project has seen us improve several key treatment processes through the installation of new rapid gravity filters (RGFs), lamella clarifiers and flocculation tanks, and upgrades to the pH correction system.

2023 marked a significant milestone in the commissioning of the project as the RGFs and Lamella plant were completed and brought into service.

**Digital innovation was at the forefront of project delivery. The use of BIM 360, extended reality, the latest handheld scanning technology, intelligent machine control and digital inspection and test records helped to foster collaboration, improve safety and drive efficiencies throughout the project.**



## Net zero winner!

**Project:** Embsay Water Treatment Works  
**Client:** Yorkshire Water  
**Location:** North Yorkshire



First built in the 1970s, Embsay Water Treatment Works is a 24ML/d water treatment site delivering clean water to 15,000 people.

To address risks to drinking water quality, the outline solution involved the construction of a new interstage pumping station, new manganese filters and a start-up-to-waste facility.

However, utilising our low carbon solutions in design approach, the PAS 2080 principles, and our Moata Carbon Portal tool, we were able to optimise the solution to deliver significant carbon, cost, and programme savings.

Through optimising existing plant processes, re-using existing assets and maximising build efficiency in design we reduced the whole life carbon on the project by 77%.

The final solution was a single precast concrete structure consisting of a new three compartment contact tank, clean backwash tank and drywell pumping station.



**Our team picked up the Institution of Civil Engineers (ICE) Yorkshire & Humber Net Zero Award and was a finalist in two categories at the British Construction Industry Awards.**

## Delivering better quality water to South East Wales

**Project:** Sluvad Water Treatment Works  
**Client:** Dŵr Cymru Welsh Water  
**Location:** South East Wales

Sluvad WTW treats up to 175ML a day of raw water from Llandegfedd Reservoir using significant amounts of ferric sulphate as a coagulant. To lower levels of manganese and iron to improve the final water quality, we engineered an innovative jet mixer solution to enhance coagulant mixing.

An outline design of the system was produced using Computational Fluid Dynamics (CFD) to provide visualisation of the flows and verify the performance of the mixer before installation. The new system now meets the minimum coagulant mixing objectives via a nozzle that distributes the coagulant and pressurised water mix evenly into the main flow, resulting in a 50% reduction in turbidity and iron levels.

Thanks to close collaboration with the client, we have successfully completed all aspects of the works on program, including excavations, pressurised pipework, hydrodemolition and under-pressure drilling on a critical main, and installation of a new pumping station.



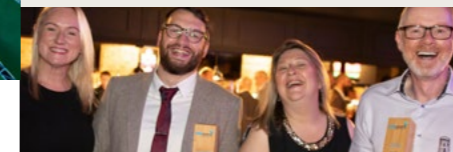
**The new dosing provides instant benefits to the treatment process and enables our client to further reduce the ferric dosing rates – a great example of where we have delighted our client with excellent project delivery.**

## Forward-thinking design

**Project:** Mosswood WTW  
**Client:** Northumbrian Water  
**Location:** County Durham

In response to a notice issued by the Drinking Water Inspectorate, mandating the installation and commissioning of a run-to-waste (RTW) facility at Mosswood by March 2024, we were awarded a £2.3m design-and-construct scheme to build an attenuation lagoon with a trickle discharge into a local burn.

Following collaboration with the client and understanding of their requirements, we identified opportunities to reduce the scheme's carbon footprint through careful design considerations. Mott MacDonald's industry-leading digital solutions platform, Moata, was utilised to calculate the carbon footprint throughout key project stages. A 46% reduction in carbon was achieved due to designing-out the pumping station, a reduction in pipe diameter and material change, communicating with a nearby site to re-use 10,000T of surplus material, and designing a minimally intrusive trickle lagoon solution.



**Mosswood won the 'Carbon Conscious' award at Northumbrian Water's Going the Extra Mile (GEM) Awards thanks to the project team's sustainable approach to project delivery.**

# Wastewater treatment

Not only are regulated UK water companies responsible for supplying potable water, but it's also their role to collect and treat wastewater. Much of our work centres on this sector, where our solutions are helping clients meet ever-tightening regulatory outputs for treated wastewater, both in terms of quality and quantity.



The team at Brecon safely negotiated 175 buried services, 25% of which were uncharted. The client praised their cooperation with residents and landowners and their own operational team.

Image courtesy of Dŵr Cymru Welsh Water

## Upgrades for the Usk

**Project:** Brecon WwTW  
**Client:** Dŵr Cymru Welsh Water  
**Location:** Brecon, Wales

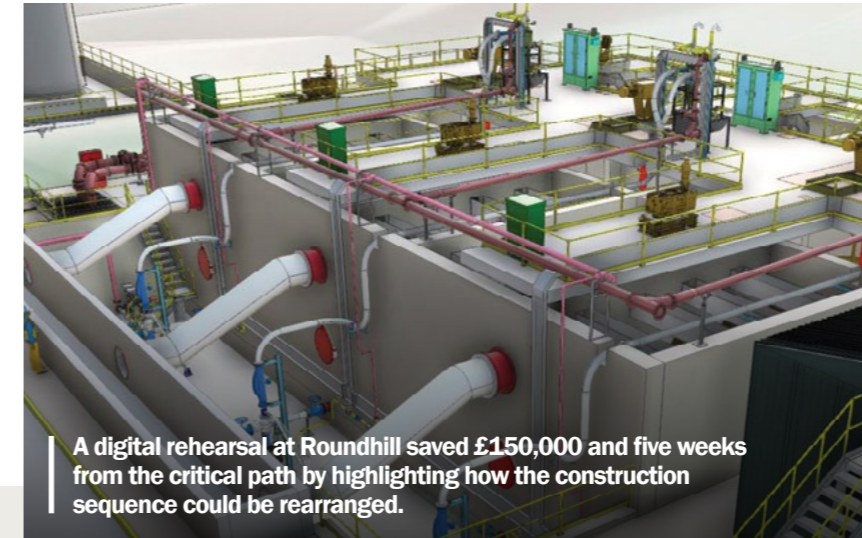
Rising in the Brecon Beacons National Park and flowing into the Severn Estuary, the River Usk is one of the longest in Wales. As part of a wider programme catering for local population growth as well as improving water quality in the Usk, we are delivering a major scheme upgrading Brecon Wastewater Treatment Works. This includes new Mecana filters, MCC, ferric dosing kiosk, and backwash pump station.

A physically tight site, the team demonstrated great care and responsibility in ensuring they successfully negotiated a multitude of buried services, a quarter of which were uncharted. The standard of excavation undertaken by the workforce was outstanding, with company operational safety standards coupling with great skill to guide the activity on site.

## Thames Water and MMB

In October, MMB secured a five-year extension with Thames Water, taking the current agreement through to the conclusion of AMP8, in March 2030. We'll be looking to build on the strong foundations established since securing our first contract with the UK's largest water and wastewater company at the beginning of AMP7. This has included forming a dedicated MMB team in the region, delivering infrastructure and non-infrastructure projects across three frameworks.

Progress was made on site on a number of schemes in 2023, including major improvements at both Berkhamsted STW and Ufton Nervet WTW.



A digital rehearsal at Roundhill saved £150,000 and five weeks from the critical path by highlighting how the construction sequence could be rearranged.

## Digital drive

**Project:** Roundhill STW | **Client:** Severn Trent | **Location:** Staffordshire

Works progressed at Roundhill STW, where we are upgrading site to meet tightening permits for phosphorus and ammonia. The project is benefiting from a host of digital delivery innovations, all stemming from a digital delivery plan devised at the project outset:

- **3D model** – of all new assets.
- **VR for visualisation of solution** – gaining buy-in from client capital delivery and operations teams who 'live' the solution before it's built.
- **Digital rehearsal for TSR plant** – collaborative 4D reviews in Synchro

identified a £150,000 saving by rearranging construction plans and saving five weeks from the critical path.

- **Moata Carbon Portal** – for carbon modelling. Comparison with an outline design solution developed by another contractor demonstrates a significant reduction in embodied carbon.
- **Intelligent plant** – 3D model uploaded to excavators enables operators to visualise what they are excavating, mitigating against over-digging on more than 50,000m<sup>3</sup> of soils.



**+15%**

## Sensitive to the environment

**Project:** Broadholme | **Client:** Anglian Water | **Location:** Northamptonshire

Bound by Ramsar Sites (wetlands of international importance) and Upper Nene Valley Gravel Pits Special Protection Area, we are delivering major improvements to Broadholme Water Recycling Centre under strict environmental measures. Agreeing the measures with planners and Natural England following detailed up-front surveys, we prevented the need for a lengthy Environmental Impact Assessment (EIA) and could reach site sooner.

Treating wastewater from Wellingborough and the surrounding catchment, the £32m upgrade is improving the current treatment process by reducing the levels of phosphorus in the treated water to less than 1mg/l, as well as increasing capacity to treat flows by 15%.

Carbon neutrality will be achieved by integrating some of the most promising technologies into the site to reduce and remove carbon – eradicating 34,000 tonnes of carbon per year.



## World first

**Project:** Strongford Net Zero  
**Client:** Severn Trent  
**Location:** Stoke-on-Trent

JN Bentley is collaborating with fellow contract partners to help Severn Trent transform one of its largest sites into the world's first net neutral carbon waste water treatment works.

The new £40m 'net-zero hub' will achieve carbon neutrality by integrating some of the most promising technologies into the site – eradicating 34,000 tonnes of carbon per year.

After initially providing early contractor involvement (ECI), enabling works, buildability advice to design teams, and advanced procurement of long-lead items, JN Bentley is now principal contractor on site, delivering the ground-breaking project through to commissioning, completion and handover in 2024.

# Nature-based solutions

**Our adoption of nature-based solutions (NBS) continues to grow as we realise the economic, environmental and social benefits of utilising natural processes to tackle our clients' challenges.**

Nature-based solutions are interventions that work with nature to sequester carbon, enhance biodiversity and improve resilience to the effects of extreme weather – ranging from constructed treatment wetlands for nutrient removal to sustainable drainage systems for flood alleviation.

Our commitment to adopting NBS continued in 2023 when we formed two dedicated working groups to grow our capability in the delivery of constructed treatment wetlands and sustainable drainage systems. These working groups bring together our project teams delivering NBS solutions; members of our technical practices for treatment, environment and networks; members of our recently formed DfMA and standardisation team; and subject matter experts from the wider Mott MacDonald Group.

Engaging with this NBS expertise and subject matter experts brings the best of Mott MacDonald's knowledge to bear on our client's projects. This year Mott MacDonald has been part of the Ofwat Innovation Fund programme, led by United Utilities, examining how to mainstream nature-based solutions in the UK.

## Nature-based solutions in action

### Luston Wetlands

We helped Herefordshire County Council deliver Luston Wetlands – the first integrated wetland built in the UK to address phosphate pollution and offset development.

The three wetland cells remove approximately 2000kg of phosphate from the water system every year, with over 85,000 plants of different species helping to remove nutrients from water passing through them, protecting the Rivers Wye, Lugg and Usk. The wetland provides tertiary treatment for a nearby wastewater treatment works with flows diverted through the wetland before entering the watercourse.

### Derringham Aquagreens

Working for Yorkshire Water we're putting in place sustainable drainage systems (SuDS) in Hull to reduce the likelihood of flooding as part of the Living with Water partnership.

We have worked closely with the client, their strategic planning partner, stakeholders and the community to design and implement a series of 'aquagreens' – vegetated basins that store stormwater runoff from roads and roofs.



▲ Read about Witches Oak - a flagship NBS for the water industry - on p21

### Our NBS working groups have three focus areas:

- 1 Best practice and knowledge** – identifying key asset types and developing standard details and guidance. In 2023 these have included horizontal subsurface flow wetlands, tree pits and bioretention rain gardens.
- 2 Training and awareness** – the working group and our wider team have been actively involved in training – from attending third-party courses on designing SuDS to bespoke in-house training on wetlands - including 'How to Build a Wetland' at Slimbridge Wetlands Centre (pictured).
- 3 Lesson learning** – promoting the sharing of lessons and good practice from the portfolio of projects we delivered in 2023.



Annual Review 2023



Ensuring pace in delivery by upscaling design for manufacture and assembly (DfMA) and standardisation

# 500

Our approach is underpinned by Moata Intelligent Content (MIC), Mott MacDonald's cloud-based platform that enables the creation, curation and consumption of standardised content. MIC allows the team to store new content in a centralised and secure repository alongside over 500 other existing components and assemblies.

# DfMA and standardisation

**We stepped up our commitment to 'pace in delivery' in 2023 by forming a new centralised DfMA and Standardisation team. The team's mission is to upscale the creation and use of standardised repeatable design content across our business.**

The team has been working with in-house experts, including engineers and technicians in Mott MacDonald's Global Delivery Service (GDS) in India, plus our supply chain partners, to grow our standard content library. Co-creation

in this fashion ensures leverage of our collective expertise: it ensures we draw on best practice, innovation and optimal solutions, and share lessons learned.

The library includes graphical content, such as fully parametric 3D assemblies, 3D components and 2D details, and non-graphical content, such as specifications, calculations and template documents.

Our project teams have used and adapted this content for different client standards and site constraints to support faster and more efficient

delivery of projects. For example, we have held two-day design sprints on radial settlement tanks and banded chemical dosing to create optimal standard designs.

We have embedded the principles of DfMA and standardisation across our frameworks by appointing local champions. These champions act as ambassadors for our DfMA vision, supporting project teams and facilitating the sharing of knowledge and best practice across frameworks.

## Client priorities

**Phosphorous removal** | Building on our experience of delivering projects for the Water Industry National Environment Programme (WINEP) since AMP5, we developed further P-removal standard content. Our P Removal Design Working Group shared best practice, innovation and knowledge as one team, with our deployment of Moata Intelligent Content (MIC) on P-removal projects winning the Enterprise Engineering award at Bentley Systems' Going Digital Awards in Infrastructure.

**Storm overflows** | To support the need to address storm overflows we've developed standard products for shaft and pipe storage to provide additional capacity in sewerage networks.

Our team working on Yorkshire Water's Storm Spill Reduction Programme led its development - working with the client, supply chain partners, colleagues from other frameworks and our DfMA and standardisation team - to be deployed across our frameworks. Outputs to date include fully parametric models that, by simply changing parameters, are instantly re-sized to suit, maintaining key design features.



Pictured: Chemical dosing rig

Annual Review 2023

# Impounding reservoirs

Man-made lakes storing water ready for treatment and supply, projects at impounding reservoirs (IREs) afford us opportunity to work in some of the most scenic parts of the UK. We've delivered hundreds of schemes at IREs, giving us the experience needed to undertake complex engineering in remote locations often facing inclement weather and tricky access, as well as regulatory deadlines.



## Intricate excellence

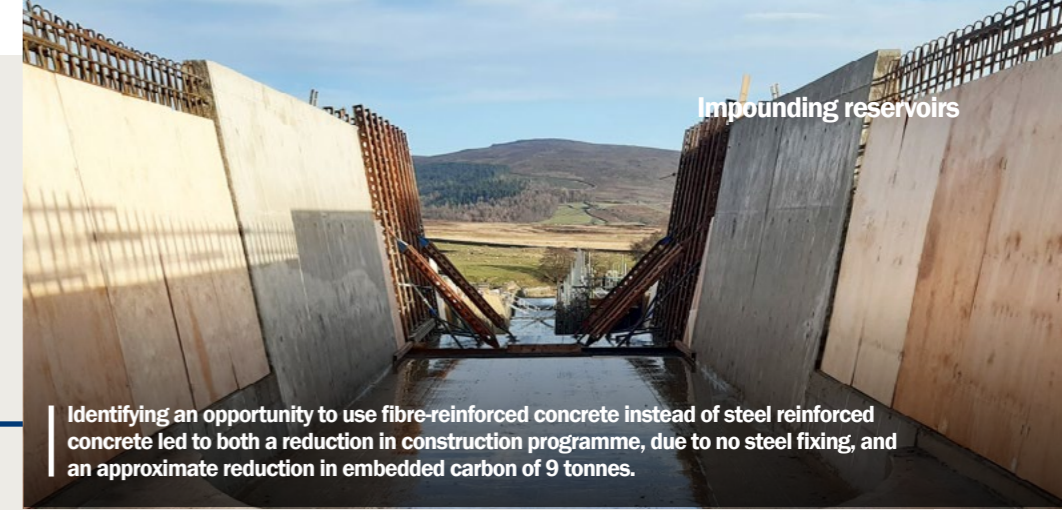
**Project:** Llyn Celyn Valves and Pipes  
**Client:** Dŵr Cymru Welsh Water  
**Location:** Gwynedd, Wales

Widely known as the 'workhorse' of the River Dee, the operation and maintenance of Llyn Celyn reservoir is critical. Following an inspection under Section 10 of the Reservoirs Act 1975, the report recommended a review of all critical valves on the scour and draw off mains. We replaced the existing 60-year-old 36-inch butterfly valve, with a 900mm gate valve, located approximately 300m into the dam tunnel.

Due to the criticality of the reservoir and the safety of our teams, temporary isolations upstream of the two existing gate valves were required to avoid working under single isolation - these were installed at water depths of 30m using expert divers. A bespoke trolley and lifting gantry system was utilised to facilitate the removal of the existing valve/pipework and installation of the new. Now complete, the project has removed a key business risk on the dam safety programme.



Thanks to excellent collaborative planning and design, the works were delivered with zero connection issues and ahead of programme, saving £60,000.



## Modern meets heritage

**Project:** Lower Barden  
**Client:** Yorkshire Water  
**Location:** North Yorkshire

Following a routine safety inspection, recommendations were made to ensure the ongoing resilience and capability of the reservoir at Lower Barden. Yorkshire Water appointed MMB to improve the drawdown capacity, control leakages and modify the spillway channel to prevent floodwater from breaching the spillway structure.

Identifying an opportunity to use fibre-reinforced concrete instead of steel reinforced concrete led to both a reduction in construction programme, due to no steel fixing, and an approximate reduction in embedded carbon of 9 tonnes.

Due to its location near Bolton Abbey, in the Yorkshire Dales National Park, the scheme was legally required to conserve and enhance the historic and natural environment. During the design phase, the decision was made to maintain the sloped walls and the curved steps to retain the heritage of the structure, with masonry used from a nearby quarry to be in keeping with the surrounding area.

The installation of a new self-priming siphon now ensures the total drawdown capacity reaches minus 5m from top water level within 5 days, meeting the safety requirements.



We achieved a challenging Measures In The Interest Of Safety (MITIOS) sign-off date at Draycote, the largest dam safety scheme Severn Trent has delivered in over a decade.

## 10-year high

**Project:** Draycote Reservoir  
**Client:** Severn Trent  
**Location:** Warwickshire

A 240-hectare reservoir and country park, the largest body of water in Warwickshire - Draycote Water - has been serving the population of Rugby and Coventry with clean drinking water for over 50 years.

After routine safety inspections identified the requirement for site upgrades, we worked with Severn Trent to increase the drawdown capacity to meet current standards.

The £11m scheme included expert diving works to construct the crest and impact chamber, along with the installation of three 1200mm dia. siphon pipes through the embankment. Work has also been undertaken to create a new pond that will capture any water released during annual testing so it can be pumped back to the reservoir.



## Keeping the water flowing

**Project:** West Hallington  
**Client:** Northumbrian Water  
**Location:** Tyneside

Using innovative digital tools, such as Synchro and Mott MacDonald's industry-leading digital solutions platform, Moata, we achieved a carbon reduction of 10% in project delivery.



Originally constructed in the 1880s, West Hallington reservoir is one of Northumbrian Water's key assets and, in conjunction with its East Hallington counterpart, has been supplying clean water to customers on Tyneside for over a century.

A £3.2m scheme, our upgrades will ensure the dam is compliant with measures to be taken in the interest of safety within The Reservoirs Act 1975 Section 10. We've improved the drawdown capacity by installing additional outlet pipes, so that in the event of an emergency, a siphon can be used to lower the water level in a rapid and timely manner, improving the reservoir's resilience and operational safety.

Despite challenging snowy weather conditions, the team made strong progress in 2023, ahead of commissioning and handover in 2024.



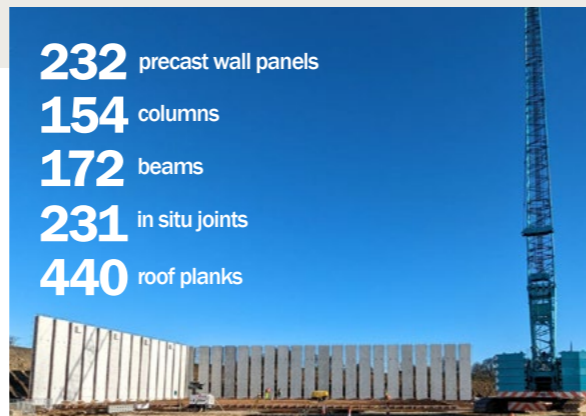
# Service reservoirs

Storing treated water ready to put into supply, service reservoirs are a vital component of the clean water network. We have honed our methodology having built many such structures for multiple clients in the last 20 years. We've pioneered the design for manufacture and assembly (DfMA) approach that sees many elements of the reservoirs built off site, before they are delivered for safer assembly in situ by our teams on the ground.



The Springwell team has embedded itself in the local community. From promoting STEM to local schoolchildren to hosting regular drop-in sessions and making community donations to local litter-picks, the team has done it all. Learn more on how we support society on pages 12-13.

- 232 precast wall panels
- 154 columns
- 172 beams
- 231 in situ joints
- 440 roof planks



## Off-site expertise

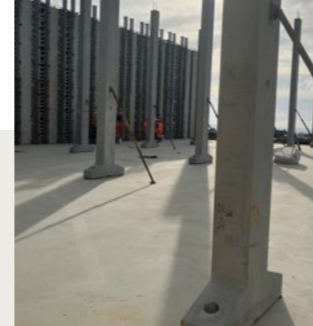
**Project:** Springwell enhancements  
**Client:** Northumbrian Water  
**Location:** Sunderland, UK

2023 saw us begin an exciting project constructing a brand new 43ML service reservoir and 5.5km pipeline at Springwell, Sunderland, in the North East of England.

The new asset will not only secure the water supply for customers in the village and surrounding area but will also support wider Wearside and South Tyneside. It will provide storage for 50,000 properties - and added resilience for a further 200,000 properties in the east of the region.

We are utilising our proven precast concrete engineering methodology to construct the reservoir which reduces the number and duration of activities on site. Precast wall panels are constructed off site in factory-controlled conditions; once delivered and stood up on site, the infill sections and floor base are poured in situ, utilising the starter reinforcement already within the wall panels to enable the structure to be stitched together.

All beams, columns and roof slabs are also precast off-site, before an in situ roof screed is cast on top to complete the structure.



# Trunk mains and pipelines

Distributing potable water and collecting wastewater across the country is a vital series of trunk mains and pipelines. Connecting treatment sites with customers, our water sector expertise sees us deliver many schemes in this sector every year, with scopes varying from repairs and upgrades to brand-new networks of pipelines catering for demand and changes in climate.

## Full steam ahead

**Project:** Seamer Street  
**Client:** Yorkshire Water  
**Location:** North Yorkshire

A public combined sewer collapsed beneath operational railway lines near Scarborough railway station, causing a total blockage of the sewer and flooding to the surrounding area. Due to the close proximity of the railway lines, it wasn't feasible to undertake repairs using a traditional 'dig down' methodology so we worked in accordance with stringent Network Rail standards to design a safe alternative.

This resulted in us laying a new 165m-long gravity sewer across Network Rail land using an open cut technique. This included an undertrack crossing (UTX) of an operational sidings line serving a turntable, one of only two still operational in the UK. The design of the exact line and level of the sewer was arranged so that none of the pipelaying works were within the track support zone (with the exception of the UTX itself).

The final quality of reinstatement drew praise from the client and Network Rail themselves.



The open cut UTX was completed in just one week, programmed for when the sidings were empty to minimise disruption. A complete track panel was lifted and placed to one side whilst the pipelaying was undertaken, with backfilling and track reinstatement carried out to exacting Network Rail standards.

**Project:** Meppershall  
**Client:** Anglian Water - delivered as @one Alliance  
**Location:** East of England



Despite a 26-week programme, the project was completed in just 20, which included the main being tested and dried out ready for commissioning once the construction of related non-infrastructure is completed.

## Alliancing in action

MMB has been a key partner on the @one Alliance since 2015. The Alliance is a partnership of seven companies closely working together to deliver complex projects in the most efficient way, right across Anglian Water's network. The Alliance is in the midst of delivering a record £1.2BN investment through AMP7.

This project at Meppershall was one such @one Alliance scheme. We constructed a 10km 355mm pipeline to take water from Flitton to Meppershall, in Bedfordshire. The route consisted of four horizontal directional drilling crossings, five open cut road closures and the crossing of the BPA Fina oil pipeline. This meant extensive liaison with multiple landowners, with good communication and low-level disturbance at the heart of our approach.

## Critical infrastructure

**Project:** SPA - non-infra | **Client:** Anglian Water | **Location:** East of England

Although the Strategic Pipeline Alliance (SPA) name might suggest a purely infrastructure project, there are a host of critical above-ground elements to the scheme too. This includes large pumping stations and two new service reservoirs, situated at main hubs across the network.

Whilst 2023 saw a focus on up-front preparatory work including design, planning and procurement of long lead time items, construction work began on a number of priority sites, including:

**Kentford** - the first project to site, the new 25MLD pumping station at Kentford is required to transfer flows to the very south of the SPA system.

**Etton** - construction of 40MLD pumping station.

**Bexwell** - together with building a new 25MLD pumping station, we're also connecting into the existing service reservoir. With the team pouring the final pump station dry well wall, a significant construction milestone was achieved pre-Christmas.

2024 is a major year for delivering the above-ground assets on SPA. The repeatable nature of some of the assets means learning will be taken from one site to the next as we tie the new structures into the pipes and ultimately get water into supply.



In summer 2023, the flood alleviation project at Sutherland Road delivered between MMB and Severn Trent won the ICE West Midlands' Communication Award. The future-proofing scheme involved upsizing over 500m of pipework along a residential road, directly outside customer properties, as well as sinking a 14m deep, 8.2m diameter storage shaft in a public space. The project team was praised for its considerate delivery, involving residents and councillors in discussions and going above and beyond to look after individual needs.

# JBA Bentley is 10!



JBA Bentley has exceeded all expectations. From a standing start, we have built a £50m+ turnover profitable business... and built integrated teams of designers, constructors and other professionals who are delivering innovative, low carbon and sustainable projects.”

Jeremy Benn  
Director, JBA Bentley



In 2023, JBA Bentley celebrated its 10th birthday. JBA Bentley is our fully integrated water and environmental engineering company, delivering feasibility, design, construction and commissioning services with a focus on low carbon solutions. Here are a few highlights.

Founded in 2013, JBA Bentley brought together JBA Consulting – one of Europe’s leading specialists in environmental engineering and management, with national civil engineering contractor, JN Bentley.

It was soon appointed to the Environment Agency’s (EA) Water and Environmental Management (WEM) framework. Working from offices in central Leeds, JBA Bentley began delivering a wide range of environmental and flood management schemes including environmental work, modelling, mapping, emergency planning, feasibility, detailed design and construction. The first scheme hit site in 2014.

A second framework soon followed – the Asset Recovery Programme of Works (ARPW) - as did a second office, this time in Peterborough to support our activity in the east of England.

2015 saw JBA Bentley demonstrate its credentials as a trusted supplier to the EA by deploying teams over Christmas to support the recovery efforts following the devastating Boxing Day floods – the first of several instances that teams have since reacted to at short notice to support our client.

This also began our historic association with the Foss Barrier in York. After

carrying out immediate recovery works, we went on to design and build award-winning permanent upgrades to better protect 2,000 properties in the city and make it more resilient to the impacts of climate change.

It wasn’t all multi-million-pound projects: the Flood and Coastal Erosion Risk Management (FCERM) framework saw JBA Bentley undertake smaller schemes across the Midlands, Lincolnshire, Northamptonshire and East Anglia. We also secured a place on the Marine and Coastal framework (MCF).

Having now established itself, JBA Bentley’s focus evolved to start specialising in the safe and efficient delivery of low carbon solutions, placing sustainability at the forefront of its delivery. This was borne out in subsequent years through schemes including Bentley Ings Pumping Station – recognised by the Institution of Civil Engineers (ICE); tidal defences in Great Yarmouth – a winner at the British Construction Industry Awards, and a flood alleviation scheme at South Ferriby – a Green Apple Award winner.

Its client portfolio began to diversify, the Coal Authority and local authorities benefiting from JBA Bentley’s expertise in environmental engineering. This included a new mine water treatment scheme at Polkemmet in Scotland, and a new pumping station with Derby City Council, engineered to better project the city against flooding – more on page 20.

In 2023, works progressed on a host of exciting projects, including a managed realignment project on the banks of the River Humber on the East Coast and a flood alleviation scheme at Holderness in Hull.

**Thank you to every colleague, client, supplier, and stakeholder that has contributed to the success of JBA Bentley over the last ten years – here’s to many more!**



# 10

2013 - 2023



# Environment

Our work in the environmental engineering sector sees us tackle a broad range of challenges that largely focus on water, from flood alleviation to mine water treatment, wetland creation to upgrading infrastructure linked to the UK's historic network of canals and rivers. Broad ranging? Absolutely!

## Carbon: crunched!

**Project:** Empire Mills  
**Client:** Canal & River Trust  
**Location:** Huddersfield, West Yorkshire

Empire Mills was one of the first schemes we completed with Canal & River Trust after securing a long-term arrangement to maintain their historic waterways and other assets.

The project saw us repair, restore and rebuild 190m of wash wall and bridge on the Huddersfield Narrow Canal, including the installation of new sheet piling and masonry repairs.

A change in construction methodology from working within the canal to the road eliminated the need for significant 'in water' temporary works and thereby a need to install, remove and dispose of 2000T of stone for a crane pad. This, and other initiatives such as identifying lengths of wash wall that could be salvaged, contributed to savings of over 250 tCO<sub>2</sub>e across the scheme - a reduced the volume of embodied carbon on the scheme by 50%.



## The Coal Authority

**2004**

First contract

**250**

Total no. schemes delivered together

**£66m**

Total value of projects

We have worked closely with **the Coal Authority** since 2004 on a variety of schemes that improve the future for people and the environment in mining areas.

In **Skewen**, near Swansea, we were tasked with installing a new transfer pipeline following a flood event. Working in a densely populated area amongst a multitude of buried services, the 375mm twinwall pipe takes mine water to a new outfall location. Through close liaison with the local community, the project was completed with zero complaints.

In 2023 we also completed a project improving the efficiency of **Six Bells Mine Water Treatment Scheme (MWTS)** in Wales through improvements we have made to the sludge drying bed and the construction of a new cascade. We also continued construction of extensive upgrades to **Polkemmet MWTS** in Scotland, where reedbeds are used to filter the water as part of the treatment process.



## Into the breach

**Project:** Outstrays to Skeffling Managed Realignment  
**Client:** Environment Agency | **Location:** East Coast

The Humber Estuary is recognised as one of the most important estuaries for wildlife in Europe. Our Outstrays to Skeffling Managed Realignment Scheme is engineering new habitats for wildlife on the estuary's north bank. It involves the construction of a new inland embankment, ready for existing defences to be breached to enable sea water to enter and create new habitats.

Despite over 20% of working days being lost due to poor weather, major progress was made in 2023. The entire length of flood embankment was completed, together with wave bund, constructed from over 800,000t of site-won material moved by dumper and dozer.

Over 6km of fencing and 3.5km of stone paths were built; over 10t of grass seed sewn over 26 hectares of embankment; and over 11,000 trees, shrubs and hedgerows planted.

**In carefully realigning the existing flood defences, the project is creating 175 hectares of mudflats and saltmarsh intertidal habitats, and 75 hectares of wet grassland.**

## Flood alleviation in action

**Project:** Holderness FAS | **Client:** Environment Agency | **Location:** East Coast

A new flood alleviation scheme (FAS) has significantly improved protection to thousands of homes, schools and businesses located near Hull in East Yorkshire. Located across two working areas, the Holderness Drain FAS comprises a new 10m<sup>3</sup>/s 'online' pumping station at East Hull, and a flood storage area at Castle Hill.

Space on site was at a real premium, causing the pumping station to be constructed online within the drain itself. To deliver the works safely, a large 30m x 25m cofferdam was formed, incorporating a bypass channel to convey all river flows. This temporary works arrangement would eventually be integrated into the permanent works saving approximately 20% in time, cost, and carbon.

**Now operational, the FAS has already supported effective incident response and recovery by protecting up to 1,000 properties during six consecutive storm events.**



# Defence

JN Bentley has a strong track-record in the defence sector, especially with Rolls-Royce, with whom we continue to deliver increasing volumes of design-and-build works across their nuclear, aerospace and defence facilities.

The works are diverse in nature, including new builds, refurbishment, civil engineering, ground works, estate infrastructure, decommissioning and a host of mechanical and electrical installations.

Regardless of client, works within this sector often see us working in close proximity to live operational environments under stringent conditions, which means our site operations are planned, communicated and delivered meticulously so as to minimise any disruption.

2023 saw us engage with a new client, **Sheffield Forgemasters**. Owned by the Ministry of Defence, Sheffield Forgemasters manufacture some of the most complex steel castings and forgings in the world. As part of broader site developments, our design-and-build company JBA Bentley has undertaken survey and investigation works to help develop solutions that address challenges associated with river abstraction and flood alleviation.

We continue to deliver works for the **Defence Infrastructure Organisation**, who are responsible for maintaining the Ministry of Defence estates across the UK. Alongside Mott MacDonald, we deliver intrusive survey and site clearance works the length and breadth of the country.



# Industrial building

2023 saw JN Bentley deliver increasing volumes of work for key clients with whom we have flourishing relationships in the industrial building sector.

We set sail into the ports and maritime sector in 2022 having been appointed to all five regional lots of **Associated British Ports' (ABP) Industrial Building Framework**, through which we are delivering increasing volumes of work.

We also continue to undertake works through our participation in the **Minor Civils Framework**, covering ABP's Humber ports at Hull, Immingham, Grimsby and Goole – an arrangement recently extended until the end of 2024.

We have been successful securing further works with **Nuclear Restoration Services** (formerly Magnox), the body responsible for the safe and secure clean-up of nuclear sites across the UK under the ownership of the Nuclear Decommissioning Authority.

In 2023, we continued to deliver design-and-build projects across sites in North Wales, including works at Trawsfynydd to increase the capacity of an existing sewage treatment plant and install multiple sludge storage facilities, as well as upgrades to a waste transfer station at Wylfa in Anglesey.

▲ **Associated British Ports** | JN Bentley designed and installed a new magnetic sensor unit at an existing wood pellet storage and separation facility at the Port of Immingham. Engaged during RIBA stage three, we progressed detailed civil, structural, mechanical and electrical design through RIBA stage four.

Construction works included the installation of piled foundations to support a new steel structure housed around the existing conveyor, a new clad structure with bi-fold doors for safe maintenance access, and a new building around the operational conveyor. The intrusive works required for installation of the magnet and sensor, with control system modifications and the diversion of 35 existing services, were delivered within two one-week shutdowns. Using Synchro, the 3D model was linked with the programme to meticulously plan, detail and sequence shut-down activities by the hour, enabling works to be delivered safely and right first time.

# Energy

In 2023 we secured works with an exciting new client, **Envision Energy**, to provide support in delivering a new battery energy storage system for their client **Sembcorp** at their facility at **Wilton, Teesside**.

On completion, the new facility has the capacity to store and distribute 150 MW of electricity, helping to balance fluctuations in demand and store electricity generated from renewable sources. This represents the first battery energy storage scheme that we have been involved in, and with our growing capability and expertise we are well placed to expand our services in this growing sector in 2024.

Following our appointment to several gas frameworks in 2022, 2023 was the first full year of delivering design-and-build gas infrastructure works for National Gas and Cadent Gas in RIIO-2. With **National Gas**, MMB is an incumbent on its Asset Health and Minor Civils Framework, through which we design-and

-build of gas infrastructure across large parts of the UK. Through the frameworks, we deliver above-ground installations (AGIs), gas pipelines, structural and asset integrity, and decommissioning, as well as a broad range of civil engineering services.

**Cadent Gas** is the owner and operator of the largest gas distribution network in the UK. Through our participation in the Multi-Activity and Capital Construction Services frameworks, we deliver design-and-build works associated with AGIs, including preheat projects, capacity upgrades, works to pressure control systems and 'non-piggable' pipelines.

Through Mott MacDonald, we are delivering increasing volumes of work for **National Grid Electricity Transmission**, managing substantial packages of intrusive survey and investigation works across the UK.

JN Bentley is registered with the **Joint Supply Chain Accreditation Register (JOSCAR)** – a single repository for pre-qualification and compliance information used by clients operating in the aerospace, defence and security industry.



# Highways and local authority

JN Bentley holds a long association with work with local authorities, first in Yorkshire back in the 1970s but now spanning across the UK, from Cumbria in the North West of England to Powys in South Wales. 2023 saw us continue to deliver projects mainly through existing framework agreements, providing both design-and-build and build-only solutions in the public realm.

## Close collaboration

**Project:** Holme Flood Alleviation Scheme  
**Client:** Westmorland & Furness Council  
**Location:** Cumbria



JN Bentley delivered a project to help alleviate surface water flooding affecting the village of Holme, assuming responsibility for a challenging project initially started by another contractor.

We installed a new outlet headwall within church grounds, as well as laying 280m of new pipework 3m-deep within the highway, with multiple manholes, road gullies, and service and culvert crossings.

In collaboration with the client, we made several design changes to realise time, cost and carbon savings. Through diligent planning and care, we mitigated environmental risks and avoided any service strikes despite encountering uncharted services, whilst adopting a working methodology that minimised the impact of our works on the community.



## Public sector frameworks

JN Bentley is present on a number of public sector frameworks through which we are able to deliver a range of works for clients across the UK. We are present on several lots of Pagabo's Civils & Infrastructure, Medium Build and DPS Frameworks, the YORcivils3 Framework as well as the Crown Commercial Services Framework.

## Historic improvements

**Project:** Bradford Beck Culverts | **Client:** Bradford MDC | **Location:** West Yorks

JBA Bentley delivered a design-and-build project to address structural deficiencies to Bradford Beck culvert, a major watercourse running through the centre of Bradford beneath the historic Odeon building. To restore its integrity ahead of a major refurbishment of the Odeon, we installed twin structural GRP liners within the culvert, grouting them into place through drilling core holes in the floor slab of the building above.

The project involved complex temporary works for access and over-pumping in a constrained city centre location. We developed a solution that used an existing flood diversion channel to divert flows around site, reducing pumping requirements and ensuring the temporary system was contained within the working area. This reduced flows by 90%, with significant cost and carbon savings (229 tCO<sub>2</sub>e).

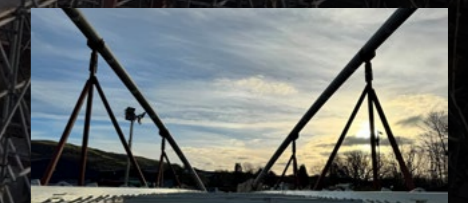


## Largest in history

**Project:** Newtown Active Travel Bridge  
**Client:** Powys County Council  
**Location:** South Wales

JN Bentley and Mott MacDonald have made great strides with the design and installation of a 60m single span butterfly arch bridge.

The bridge comprises a steel framework with a composite reinforced concrete deck, supported by reinforced concrete abutments and bored continuous flight auger (CFA) piled foundations. The parapet system is formed from profiled stainless steel plates for the posts to support the wire infill panels to provide a safe, low maintenance and modern appearance.



Despite facing challenges such as a constrained working area, contaminated land, steep slopes, uncharted services and complex temporary works involving the largest single lift undertaken by JN Bentley - a staggering 91t lift at 57m radius - the team is on-course to complete the delivery of this iconic structure that will improve local accessibility in the summer of 2024.

In the pipeline:

# Great opportunities



On the whole, we're in a great position.

Our hard work in 2023 has seen us successfully grow and is providing us with great opportunities across the water, environment, energy and industrial sectors, through 2024 and beyond."

Jonny Burton  
Director

Sunrise at Llyn Celyn, Wales  
Photo by Eilir Thomas - Engineer

## 2024 focus

Like 2023, 2024 is going to be another busy year for us as we work to hit our client's regulatory dates across the water sector to complete our AMP7 work. 2024 marks the early start of AMP8 for some clients and a transition for others; all of the water companies have submitted their five-year business plans to Ofwat, and all are indicating significantly larger programmes than any previous AMPs.

We are re-bidding for many of our existing water sector clients and have recently secured our first two AMP8 frameworks for Northumbrian Water and South West Water. This will see Mott MacDonald Bentley (MMB) bring its track record of innovative design-and-build self-delivery to the south west of England for the very first time. We are looking forward to collaborating with a new client to solve challenges and deliver on business plan priorities.

AMP8 will bring with it a shift in operational delivery vehicles: a good number of our clients are moving towards enterprise and alliance models which will improve delivery and collaboration across the industry. We will be able to build on our skills, knowledge and experience from our work within existing alliances such as @one and SPA for Anglian Water, and our alliance with Dŵr Cymru Welsh Water.

## Non-water and environment

2023 saw us celebrate 10 years of our design-and-build business, JBA Bentley, which specialises in the safe and efficient delivery of low carbon solutions outside of the regulated water sector. JBA Bentley has delivered some fantastic projects for clients such as The Environment Agency (EA) and the Coal Authority. During 2023, our work with the EA has decreased with the completion of previous frameworks, although we continue to engage and have recently secured places on two lots within a new EA framework. We will be working with the EA to provide asset operation, maintenance and response services across civil engineering and MEICA (mechanical electrical instrumentation control and automation) projects. This new framework will allow us to continue to deliver work and be in a good position to bid for future projects and frameworks in this important sector.

We continue to build relationships with new clients Canal & River Trust and Associated British Ports as we demonstrate to them more of our skills on site, and the benefits of an integrated design-and-build approach. As JBA Bentley we also secured our first projects with Sheffield Forgemasters, a global leader in steel production and engineering. Additionally, we are actively pursuing more opportunities within the energy sector including with our gas clients, National Grid and Cadent Gas, and a focus on renewables with battery energy storage projects.

Sustainable solutions remain a priority for us, our clients and the communities we operate in - and will continue to be key to our projects as we move into AMP8.

## Client needs

The effects of global supply chain issues and inflation continue to linger for our clients who are facing capacity, capability and affordability challenges. In short, they are facing higher pressure to deliver projects quicker with increasingly limited industry resources.

When it comes to tackling these challenges, one of our biggest strengths is our people. Our direct delivery approach gives us the ability to support from both a capability and capacity perspective as we continue to attract, retain and train our own workforce and invest in our people. In 2023 we reached a milestone of directly employing 700 frontline construction workers to ensure the successful delivery of our workload, and we continue to bring new talent into the business - and therefore the industry - at all levels.

Investing in early careers has long been a cornerstone of our business, helping build a sustainable future workforce. 2023 saw us recognised for this commitment to supporting learning as a Gold Member of The 5% Club. In October, we also launched a brand new development programme that provides our apprentices and graduates with a framework for career development.

Our relationships with our supply chain remain strong. Our 'procurement with purpose' approach sees us collaborate with existing and potential suppliers to ensure that both our newer and our established long-term relationships continue to go from strength to strength, helping us design, develop and ultimately deliver for our customers.

On the whole, we're in a great position. Our hard work in 2023 has seen us successfully grow and is providing us with great opportunities across the water, environment, energy and industrial sectors, through 2024 and beyond. We will no doubt continue to see some of the same challenges - as well as new ones - so it's important we continue to innovate and deliver safe, efficient and sustainable solutions.



BURTON

Jonny Burton | Director



**MMB** MOTT MACDONALD  
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