



UK CONSTRUCTION
ONLINE™

AMP 6


An aerial photograph of London, England, showing the River Thames and the Tower Bridge. The city is densely packed with buildings, and the river flows through the center. The Tower Bridge is illuminated with blue lights. The text 'AMP6: A' is overlaid on a white rectangular background.

AMP6: A

WATERSHED

MOMENT

**DOES AMP6
REPRESENT A
SEA CHANGE FOR
INFRASTRUCTURE
INVESTMENT IN THE
WATER INDUSTRY?**



AMP6 kicked off in March 2015, with the utility companies moving into the sixth phase of asset management following a long period of tendering and negotiations.

This phase of investment has seen a shift in focus from short term investment, replacing the ageing structures and systems to improve efficiency, to a 'totex' - or total expenditure investment - looking to improve and upgrade the systems for future benefits and in the long-term.

The realignment was set out in an Ofwat report, published in 2013, which showed the methodology Ofwat would use to assess water companies' business plans for AMP6.

The new methodology, which relates to water supply and sewerage in England and Wales, made it clear that the water industry's emphasis was shifting from the 'ticking regulatory boxes' approach of previous AMPs to focusing on value for money for customers.

For the first four AMP periods, water companies' business plans were dominated by the need to meet tough European Union legislation covering issues like wastewater quality and wildlife habitats.

This period will see water companies trying to get the most out of their existing

assets and finding ways to minimise cost of operation.

The Ofwat document declared that water companies should be focusing on what it called 'long-term outcomes', which it hopes will encourage innovative ways of working that will deliver services for less money, and with less impact on the environment. As a result, the regulator expects to see substantial efficiency savings being delivered during the five year AMP6 period.

At the same time, Ofwat wants to encourage companies to manage water supplies more sustainably. It believes this will happen because the companies will no longer have a bias toward capital intensive and resource intensive solutions, and because it is introducing incentives to encourage the water companies to trade water and to source it from areas that do not damage the natural environment.

This shift in emphasis is leading to water companies looking for different skill-sets from their supply chains - expertise that will help make more of existing assets.

The focus on long-term thinking is also being reflected in the way some water companies are looking to procure the firms that will deliver work during AMP6, with many opting for alliances, or for frameworks that run beyond the traditional

five year AMP period.

Ofwat gave final approval to a £44Bn spend by water firms over the next period at the end of 2014, saying that the deals struck with the water companies will lead to 5% average fall in bills across England and Wales.

Jonson Cox, Ofwat Chairman, said: "This is an important step in maintaining customers' trust and confidence in the water sector.

"We set out to deliver a challenging but fair outcome. We are requiring companies to meet higher service standards and deliver on their promises to customers.

"We are bringing down bills so customers can expect value for money, while investors can earn a fair return. Companies will need to stretch themselves to deliver much more with the same level of funding as in previous years. We will achieve more resilient infrastructure and better service as a result."

Alongside the asset investment and upgrade, major projects set to take place include Severn Trent Water's Birmingham Resilience project, Wessex Water's integrated supply grid, and modernisation of United Utilities' Davyhulme wastewater treatment works, with the Thames Tideway Tunnel to be financed and delivered by an independent provider. ■



Shaping The Future

WEHOLITE

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Weholite proves to be an Asset to Bristol Water treatment plant

Asset International Ltd, the UK's leading water management solutions company, has provided main contractor, BAM Nuttall with an extensive array of Weholite inter-process pipework and complex fabrications for the new £3million UV treatment building at Bristol Water's Barrow Gurney water treatment works.

The works at Barrow Gurney - which treats water from three reservoirs at the site - ensures that the water is safe for drinking.

In recent years ultrafiltration and UV treatment have emerged as effective and popular means of removing certain types of bacteria and protozoa from potable water and as a result water companies across the UK have been spending hundreds of millions of pounds upgrading their facilities to incorporate UV treatment methods as part of the AMP6 programme.

At the Barrow Treatment Works the main UV building accommodates the process units and the pipework and services supplying them. Asset provided hundreds of metres of Weholite; in diameters ranging from 1000mm to 1400mm to link the UV process units to the rest of the treatment facilities. Complex Weholite fabrications that had been modelled using FE Analysis by Asset's engineering design team, and manufactured at its Newport factory were also supplied in order to connect the inter-process pipelines to ductile iron valves, flow meters and static mixers. Weholite's unique, designed-in versatility enables its interface with just about any existing design.



All Weholite components were designed, manufactured and prefabricated at Asset's South Wales factory before then being transported and installed at the Barrow site, saving the contractors a significant amount of time on the schedule.

Martin Wearn from BAM Nuttall, said: "The benefits of utilising Weholite pipework have to be the reduced lead in times for fabrication and its low overall weight, when compared to that of traditional material pipework."

Rex Lewis from Bristol Water, commented: "In certain low pressure situations, the use of Weholite pipe provides a very versatile and cost-effective solution".

Rhys Williams, Technical Sales Engineer at Asset International, said: "During the planning process - and every subsequent stage of the project - Asset provided a full and detailed design service, technical support and advice to ensure that it ran smoothly. We also supplied a site services team to assist BAM Nuttall, to conduct extrusion jointing using our latest specialist equipment.

"Asset and BAM Nuttall's involvement in the project begun in October 2015, and concluded shortly before the New Year. The project has now been passed on to mechanical and electrical contractors."

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ASSET MANAGEMENT

IN THE AGE OF BI

OPEN to all organisations involved in the management and delivery of water and wastewater assets, BIM4Water aims to assist the UK water sector in its adoption of Building Information Modelling (BIM) during AMP6.

Jon de Souza, Business Improvement Manager at Galliford Try and immediate past Chairman of BIM4Water, spoke with UK Construction Media about the creation and remit of the Organisation and the integral role that education and standardisation has to play in the successful adoption of BIM.

Could you first of all provide our readers with an introduction to BIM4Water? What would you describe as being the aims and objectives of the Organisation?

BIM4Water is the water sector's response to the growing push for BIM across the wider built environment sector which has been given greater impetus by the Government's BIM mandate. The Government's BIM strategy has been a mixture of push and pull. On the push side, the BIM Task Group has launched a number of BIM4 groups looking at various different sectors across the UK Construction market. BIM4Water is one such group. Each of these

organisations exists to assist its own part of the market in its BIM adoption and, essentially, this is our mission – to support those organisations in the water sector with an interest in BIM.

In terms of how we achieve this, five key priorities were decided upon by our membership and we have activity relating to each of these.

The first is a need to gather evidence from the water sector and elsewhere on the value of BIM. We're doing this through two main strands of work. Firstly, by using retrospective case studies to highlight warts and all stories from a number of sectors. We're not just interested in good news stories as we recognise that there is a huge amount of learning to be had from projects that perhaps don't go quite as well as intended.

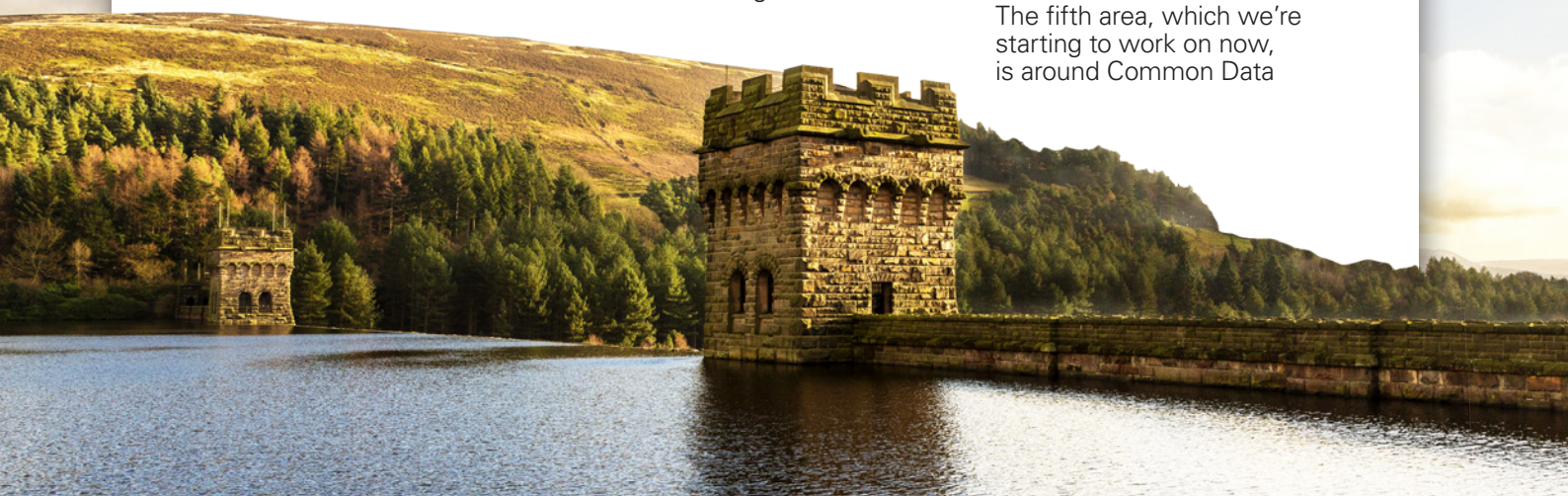
We have also launched a programme of live demonstration projects. We've had a number of projects using aspects of BIM brought to us by our members. Those members are quite open to other organisations observing their progress through the design and construction process and into asset operation, to give an understanding of the impact that BIM has had on the success of the capital delivery and asset management.

The second area that we are looking at, which is interrelated as we need the evidence from real projects, is developing a business case for BIM in the water sector. We're hoping that we can produce a proper cost benefit for BIM, taking into account all of the relevant investment requirements and benefits.

Our third key work area is around the production of guidance. Our first output was our recently completed FAQ which is now available on the BIM4Water website.

One of the areas that has seen the most activity is standard libraries. Most manufacturing organisations in the water sector want a consistent approach to the data demands that are placed on them through project lifecycles. One of the worst things we could do as an industry is have as many different approaches to data as there are clients or contractors, and so the Standard Libraries Task Group is trying to produce a standard for what data is asked for from product manufacturers at different points of the capital delivery process. It's also looking at intelligent P&IDs and other areas around standard data.

The fifth area, which we're starting to work on now, is around Common Data



Environments for the water sector and how they relate to the BIM standards such as PAS1192.

What is your own professional experience? How did you become involved with BIM4Water?

I've been with Galliford Try for about three years. Prior to this I worked for Constructing Excellence – an industry improvement organisation which was involved in the development of the initial Government BIM strategy. Having moved to Galliford Try's water division, I was surprised to see that there was very little talk about BIM in the water sector.

With support from David Philp on behalf of the BIM Task Group, a small number of us were able to put together a BIM4Water group and I was delighted to be asked to chair the group on inception. The water sector has generally been quite forward thinking in adopting collaborative and integrated working practices and, with BIM being an enabler of better collaborative working, it seemed likely that water clients would understand the value of BIM.

What advantages can BIM offer the water sector, specifically in its delivery of AMP6?

The key benefit of BIM will come through the whole life value that it can help deliver. The expectation is that the use of a BIM process will enable optimum decisions to be taken at all stages in the delivery and management of a built asset with the greatest gains, including financial savings, coming in asset management

thanks to clients having access to the right asset data. There will also be huge benefits from BIM in capital delivery, including using BIM as a way of engaging with the water company staff responsible for the operation and maintenance of an asset. The facilitation of a collaborative approach is central to the benefit of BIM. The use of BIM will not only improve the predictability of outcomes – in terms of cost, time and quality of the asset – but also support better health and safety and environmental performance.

Within our sector though, there seems to be a view from some quarters (which needs to be addressed) is that BIM is more related to capital delivery than asset management. And there are some technical challenges. For instance, I know that a lot of water companies have invested quite heavily in recent years in their asset management systems and in some cases there is a lack of understanding regarding how the data from a BIM process can be fed into those asset management systems as seamlessly as possible.

You've mentioned some of the difficulties facing the water sector with regard to BIM adoption. Are there any other significant challenges that BIM4Water is working to overcome?

The lack of Employer's Information Requirements from clients has been a challenge.

Quite a few clients have looked at early BIM pilot projects but certainly been rare that the client has come forward at the outset of the project with a set of

defined Employers' Information Requirements stating what data they want at each stage of the project. It's been left to the supply side to second guess what will be required. This isn't necessarily a criticism of clients because BIM is new to our sector and I think the best way that we can solve an issue such as this is to work together as an industry. I would like to think that this is certainly something that BIM4Water can play a role in because again, coming back to my point about standardisation, it would be nice if the requirements from different clients were broadly aligned.

There is also still a huge amount of education to do all the way through the supply chain. I think we're still coming up against a lack of understanding of BIM in the market and real evidence of BIMwash. For example, at BIM conferences I often hear people say that they're doing Level 3 BIM, but that can't be the case as that hasn't been properly defined as yet. All misinformation such as that does is undermine the confidence that both supply and demand side organisations have in what BIM can do. This BIMwash can also be a real issue in procurement.

Within BIM4Water we have representation from almost all of the water and wastewater companies. We're trying to get the message out, through our own networks and by working with organisations such as British Water and the Water industry Forum, regarding not only the benefits of BIM but also the reality of where we are as a sector and the journey that we need to go on collectively.

BIRMINGHAM 'RESILIENT'

AQUEDUCT RESTORATION

FOR over a century the iconic Elan Valley Aqueduct (EVA) has channelled water from the Welsh vales towards the city of Birmingham, some 73 miles away.

A Victorian-era feat of engineering, the EVA has remained at the forefront of Birmingham's water provision since its opening in 1906. Indeed, so reliant is Birmingham on the historic aqueduct that Severn Trent Water has been unable to close the EVA to accommodate much-needed restoration and modernisation works.

Hence, the Birmingham Resilience Project (BRP) - one of the greatest engineering challenges ever undertaken by Severn Trent Water. Through the BRP an alternate source of water is to be created to facilitate periods of maintenance. Birmingham's water supply will be entrusted to this second source for up to 50 days every other year, during which the EVA will be structurally assessed and repaired as required.

To enable this ambitious undertaking, water from the River Severn will be abstracted at Lickhill and pumped 16 miles cross country to a newly built treatment plant at the existing Frankley water treatment works.

Simon Hinsley, Severn Trent Water's Project Manager, explains: "What this solution

gives us is a new source, the Lickhill intake, which will take water from the River Severn at Stourport and pump it into Frankley.

"It won't provide an entire duplication of the capacity of the aqueduct but it will give us about a third of what we need. Additional flow will come from our existing site at Trimley, where we are making a cross-connection to allow Trimley's water to flow into the EVA.

"Those two sources will give us about two thirds of Birmingham's demand. The remainder will come from borehole sources around the city, from South Staffs Water's Barr Beacon reservoir, and from an existing connection to our strategic grid into Birmingham. These sources will make up the shortfall from Trimley and Lickhill."

One of 22 potential sites surveyed by Severn Trent Water, Lickhill was chosen for its depth of water and geographical features, which ensure that the pumping station will remain above projected flood levels.

Severn Trent Water will construct a water intake on the river bank, alongside a pumping station with four large pumps, each buried 15m into solid rock. Once built, the vast majority of the facility will be obscured from view,

while those elements that are visible will be housed within a purpose-built farmer's barn.

The preferred pipeline route was agreed following two years of preliminary technical work and an extensive first round of public consultation. The route - which spans communities, road and rail infrastructure, nature reserves and sites of specific scientific interest - provides its own unique challenges however.

To be constructed in an open trench, the one metre wide pipeline will need a 45m wide working area. Tunnelling machines will be used at particularly sensitive points, while trenchless tunnelling methods will be implemented to bypass nearby roads without the need for closure. Severn Trent Water will also liaise with those landowners effected to minimise disruption where possible.

Water from the River Trent differs greatly in composition to its Welsh equivalent however. Thus, Frankley water treatment works must be upgraded and extended if it is to accommodate an additional source. Clarification tanks are essential to treating raw water, while rapid gravity filters, chemical dosing facilities and safe storage for substances used will all be necessary

TRENT' AS ELAN VALLEY

CONSTRUCTION NEARS

if safe drinking water is to be guaranteed.

Furthermore, Severn Trent Water is planning a sludge treatment plant which will make safe any particles removed from raw water. Though much of the development will occupy a former brownfield site, the sludge treatment plant will be built on land designated as Green Belt. Severn Trent Water is therefore limiting the height of the facility to no more than nine metres, with a view to minimising its visual impact.

The environment will remain a constant consideration throughout the BRP. Progress will be monitored closely by the Environment Agency, while abstraction will be permitted only if the river flow remains above the agency's 'Hands Off Flow' levels. These figures

are calculated to ensure that there are no adverse effects on the river, its ecology and any users downstream. As such, operations will take place in the autumn and winter when river flows are typically higher. Effort will also be made to restore the landscape to its natural state once construction is complete.

In recognition of the River Trent's standing among fishermen, Severn Trent Water will also collaborate with angling groups to ensure that high fish populations and cherished angling spots are preserved.

The Birmingham Resilience Project is a considerable undertaking then, both logistically and financially. In total an approximate £242M will be invested by Severn

Trent Water over the five year lifespan of the project. Ofwat, the economic regulator for the water sector, expects the project to be delivered ahead of AMP6's end date - March 2020.

But it is a necessary undertaking also. Without this intervention Birmingham's water supply is left increasingly vulnerable. By investing in new infrastructure, Severn Trent Water is creating a more sustainable water supply for Birmingham and its surrounding communities. A fact to which Liv Garfield, CEO of Severn Trent Water, can attest: "We believe this is the chance for us to invest in an asset which has served us well for the last hundred years and will now serve us well for the next hundred to come."





With Weholite

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Asset delivers AMP6 pumping chamber project

Asset International, who produce Weholite large diameter plastic pipes, is set to deliver a large number of new AMP6 projects in order to help improve the water infrastructure of the UK.

As a key player in the water management industry, one of the first projects Asset International have helped to implement include the upgrade of Heage pumping station in Derbyshire, which is owned by Severn Trent Water.

Asset has a long history of delivering successful projects for all the UK water companies and were the natural choice for a project that came with a number of complexities, principally that space was extremely limited on site, with restricted storage capacity space for construction materials and waste. Additionally, the pumping station is adjacent to an area of ecological importance, and so green credentials were key.

The refurbishment of the Heage works is being led by principal contractors Nomenca, who were charged with the role of upgrading existing facilities at the pumping station. Heage is just one of hundreds of pumping stations across the UK that will be undergoing remedial works as part of the AMP6 investment programme, as water companies look to update the country's aged water infrastructure.

Having previously worked with Asset on a number of projects, Matt Bates, Project Manager at Nomenca, knew that the site's unique requirements could be met by Asset, whose innovative approach to solving construction problems, by utilising modular techniques, appealed to the contractor.

Part of what the site required was a wet well pumping chamber that could be lowered vertically into the ground, to a depth of approximately 4 metres, in one lift. To meet these conditions Asset manufactured a 3.5 metre diameter by 4 metre long chamber, which was prefabricated and tested at their Newport factory, before being delivered and installed on site in just a few hours.



It is believed that adopting such an approach saved Nomenca almost a month on programme and as a result had a major reduction on associated costs. Additional benefits to the contractor were the reduced health and safety risks and environmental impacts.

Matt Bates from Nomenca commented: "This contract at Heage SPS was a great example of Production Control. All parties from design, supplier, construction team and the client worked collaboratively to deliver success. The Weholite packaged pump station is the largest size that has been installed at present within STW and achieved the AMP 6 goals of 30% quicker, 20% more efficient and 30% more productive.

"NMCNomenca are promoting Weholite packaged station within the STW Framework to include both Infrastructure and Non-Infrastructure work streams."

Shaun Kalies, sales director at Asset said: "Thanks to our superb design team and manufacturing expertise we are able to fabricate products off site and supply them in modular form so they can be installed safely and efficiently on site.

"This enables us to deliver one of our key client promises - better value.

"We have worked with Nomenca and Severn Trent Water for many years. They have an innovative and forward thinking approach to project management and were early adopters of Weholite technology. We look forward to working with them throughout the ongoing AMP period."

For more information about Weholite call Asset International Ltd 01633 273081 or visit www.weholite.co.uk



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DAVYHULME

MODERNISATION

MAKES HEADWAY

DAVYHULME Wastewater Treatment Works - the largest treatment plant in the North West - is to be brought headlong into the 21st century as part of United Utilities multi-million pound modernisation programme.

Currently, more than one million people are served by the historic wastewater treatment works. Here, more than 100 years ago, sewage treatment processes still in use today were pioneered. But the aged infrastructure must be modernised if Davyhulme is to continue to treat wastewater to the highest standards possible.

In total £200M will be put towards the remediation of a once derelict plot of land which, in turn, will allow for the construction of six circular primary settlement tanks and a new activated sludge plant with ten circular final settlement tanks. The modernisation will bring significant environmental benefits for the site, improving outflow and consequently the quality of water entering the Manchester Ship Canal.

Previously, United Utilities invested £100M in an innovative new system for Davyhulme that uses sludge - a by-product of the water treatment process - to power the facility.

Richard Sutton, United Utilities' Senior Project Manager, said: "Davyhulme is an iconic site where modern wastewater treatment was invented more than a hundred years ago. We

are keen to get started on this next development in the plant's history, to ensure we continue to serve the people of Manchester into the 21st Century.

Richard continued: "This is one of the biggest upgrades we have ever carried out at Davyhulme. Parts of the process date back to the 1930s and this is all about upgrading the plant so that it can serve the people of Manchester for decades to come.

"By modernising the works we'll be able to treat the wastewater to higher standards and fine-tune the process so it can perform better regardless of the weather."

Given the significance of the works, United Utilities has been keen to engage the public in the process via a series of informative consultation events. Richard adds: "We know local people will have questions about vehicle movements, construction noise and odours and we're keen to be able to address any concerns."

In March 2015 United Utilities entrusted the Laing O'Rourke Imtech (LORI) joint venture with the modernisation of Davyhulme. The joint venture will employ advanced digital engineering and Design for Manufacturing and Assembly (DfMA) techniques to realise the plant virtually ahead of its actual construction. These methods will enable United Utilities to optimise the long-term operation

and maintenance of the facility.

Crucially, the delivery team's experience with DfMA will allow the plant will remain open and fully operational throughout its modernisation.

Of the appointment Graham Flynn, Project Director for Laing O'Rourke Imtech, said: "We are delighted that United Utilities has selected Laing O'Rourke Imtech to help Davyhulme Waste Water Treatment Works become one of the UK's most efficient and sustainable waste water treatment plants. Our ability to maximise the benefits of modern, offsite construction and engineering techniques is central to our solution, meaning that we can deliver this complex scheme in a live environment with minimal disruption."

Laing O'Rourke Imtech is now working alongside a separate joint venture between Hyder Consulting and Mott MacDonald. Rob Dunstan, Technical Director for Hyder-Mott MacDonald joint venture commented: "The Hyder Mott MacDonald JV is delighted to be collaborating with LORI on this prestigious project. The approach to the design will be industry leading and will make full use of building information modelling technology to ensure a world class solution that stands the test of time."

The modernisation, which is currently ongoing, is anticipated to continue until summer 2018.



COMMUNITY



STAKEHOLDER



E-BOOKS



VIDEO



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