

South East Water AMP5 Capital Programme

relationship based approach adopted by South East Water and Jacobs leads to savings and efficiencies

The current South East Water was formed after the merger of Mid-Kent Water and the original South East Water in 2007. It supplies on average 565 million litres of water every day to 2.1 million customers across Kent, Sussex, Hampshire, Berkshire and Surrey; an area covering over 5,657km². The company has over 14,500km of water mains served by 197 service reservoirs, 339 pumping stations, 252 production boreholes and 93 water treatment works. South East Water's 2010-2015 AMP5 capital programme was set by Ofwat at £390m with £265m to be delivered through the company's internal Engineering Department.



March 2012: Constructing Aylesford Reservoir - Courtesy of South East Water

Delivery model

Following the merger, the Board of South East Water (SEW) took the innovative step of establishing a unique, new model to deliver the capital investment in AMP5. A competitive tender in 2009 resulted in a successful partnership between SEW and Jacobs to create an integrated delivery team.

The integrated team combines SEW's knowledge of asset management and stakeholder engagement with Jacobs' expertise in delivering complex infrastructure programmes to create a highly effective team. A bespoke contract was developed so that both companies share any performance gains or losses across the programme, leading to increased focus on efficiency and a greater sense of partnership.

The team of eighty South East Water and Jacobs staff, working side by side at SEW's headquarters in Kent, is led by Head of Engineering Desmond Brown. This seamless team includes engineers, project managers, environmental specialists and construction managers, with links to operations and asset management teams.

Integrated teamwork

Great teamwork is evident at every level, with no delineation between South East Water and Jacobs employees. All staff attend South East Water briefings and meetings, and appraisals are carried out by line managers irrespective of the employer, engendering the ethos of a single team.

The team was hand-picked to harness the most relevant skills from each company to meet the clearly defined objectives of South East Water. Unlike the previous fixed structure which focused on project by project delivery, the team has adopted a matrix style of management with a central resource pool of technical knowledge. Utilising Jacobs' expertise and resources both locally and in Jacobs' India offices, allows for flexibility and cost savings on the project and also provides an opportunity to increase the core team during periods of peak demand, without having to retain surplus resources on the contract, which are not always required.

This integrated approach has realised 20% savings on resources compared to AMP4 levels.

Health and safety achievements

Jacobs' *BeyondZero*® approach to safety features as a major part of the project delivery team culture, emphasising the goal of achieving a workplace free of incidents and injuries and encouraging each individual to commit to making safety a personal value on and off the job; with colleagues, family and friends.

South East Water's senior management team was keen to embrace this, and subsequently Jacobs introduced Incident and Injury Free (IIF) training, initially for all members of the engineering team. Due to its success, this was rolled out to other departments including asset management and operations. Within the first two years of the partnership there has been a cultural change in health and safety, resulting in double the number of toolbox talks given by the contractors, a 45% reduction in the engineering and construction RIDDOR AFR (*Reporting of Injuries, Diseases & Dangerous Occurrences Regulations – Accident Frequency Rate*), and a 75% reduction in the utility strike rate.

Environmental expertise

The South East Water region contains some very important environmental and ecological habitats and sites. The South Downs National Park stretches along the southern boundary of the water company region and surrounding countryside contains large tracts of land designated as Areas of Outstanding Natural Beauty and Sites of Special Scientific Interest. Consequently South East Water has a very proactive environmental team which draws on the vast experience available within Jacobs to undertake ecological and environmental surveys to inform and adopt the most appropriate mitigation to minimise any impact on the environment by the project work.

Programme management

One of the major capabilities Jacobs has brought to the integrated delivery team is its experience in managing large infrastructure

programmes. From the start the engineering delivery team looked to change the way it delivered projects. To assist this, a Programme Implementation Plan (PIP) was developed as a blue print for the way things were to be done going forward.

Part of the implementation plan was the introduction of a robust industry recognised programming tool (Primavera P6) to drive performance and report progress. A dedicated team of Project Controllers were seconded into South East Water from Jacobs. They were aligned to Project Managers to assist with delivery and cost reporting.

The use of P6 has enabled Project Managers to monitor progress and performance on their projects through a monthly Earned Value review. This review identifies any risks or issues so that they can be mitigated and reported accordingly.

The use of P6 has also encouraged better month-on-month forecasting with the annual forecast for the last three years coming in within 5% of the budget. This has given the South East Water executive management great confidence that the Engineering Delivery team is managing the projects correctly.

Capital programme delivery

The main areas of the AMP5 Capital Programme are outlined below:

Water Treatment Works (WTWs)

The major AMP5 regulatory deliverable for this part of the programme was the provision of cryptosporidium protection at ten of the WTWs across the South East Water region.

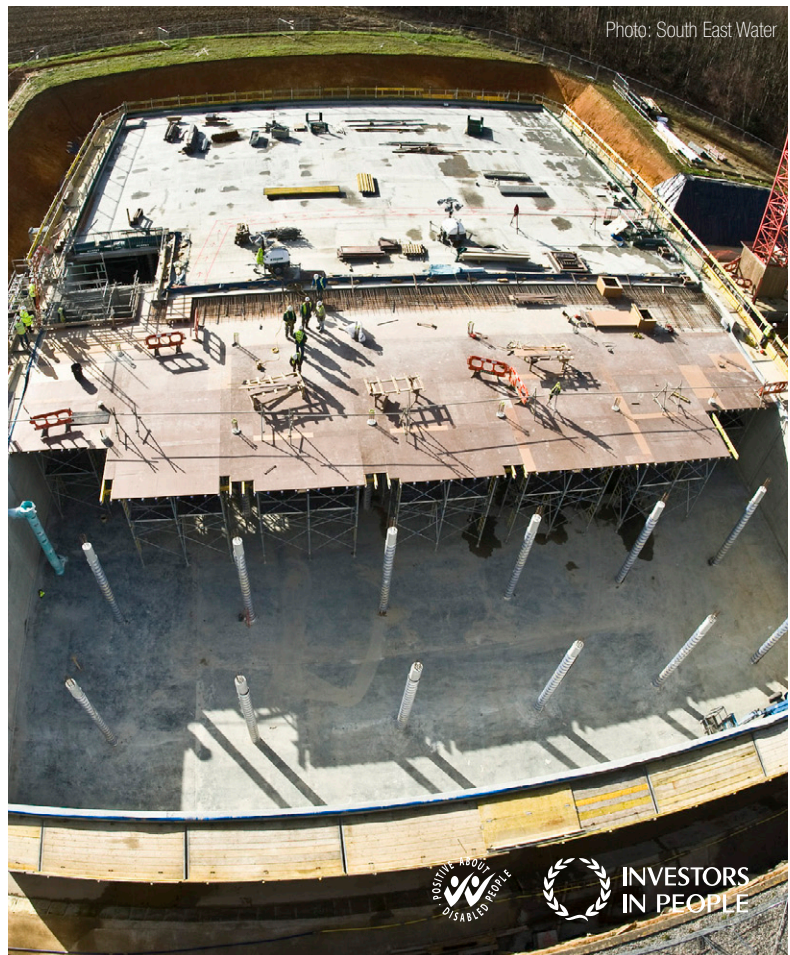
Each site had a Drinking Water Inspectorate (DWI) regulatory output attached to it which would be achieved by the construction of an Ultra Violet (UV) plant by a prescribed date. The sites were grouped in lots for procurement and delivery efficiencies.

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Tonbridge WTW: The UV scheme at Tonbridge WTW was combined with an upgrade project to increase water output from 2.3 to 4.9ML/d. This stand-alone project was competitively tendered in year one of the AMP, with a contract awarded in January 2011 on the basis of NEC option C target cost.

3D modelling of the existing building enabled 6 (No.) new pressure filters and a low pressure UV reactor system to be installed, whilst keeping the existing plant operational, negating the need for a separate building.

Tonbridge WTW was featured in full in UK Water Projects 2012.

Lot 1 Schemes: It was decided to use the Lot 1 projects as the procurement route to setting up a new UV delivery framework with a single contractor. Following pre-qualification, a competitive tender was undertaken in 2010. The framework was subsequently awarded to a single contractor but with a reserve for risk mitigation. Three separate NEC option C contracts were awarded for each of the sites in May 2011 which were successfully delivered meeting the DWI outputs over the February/March period of 2012.

Lot 2 Schemes: During the first year of the AMP, a capital maintenance framework was established with three contractors, including one that overarched the already established UV framework. This gave South East Water flexibility when delivering schemes with both UV and capital maintenance elements.

The Lot 2 schemes at Barcombe and Crowhurst Bridge were examples of this and it was identified early on that combining the UV and capital maintenance aspects into single projects could realise delivery efficiencies and overcome CDM concerns. However, in early 2012 the contractor went into administration so an alternative procurement route had to be determined quickly.

It was decided to release both projects for competitive tender and in March 2013 a NEC option C contract for Barcombe and another NEC Option A contract for Crowhurst Bridge, were awarded. Both projects are now on-site and are proceeding well towards the sectional completion dates for the UV in February 2014 ahead of the DWI deadlines.

It was a testament to flexibility of the procurement strategy developed within the South East Water/Jacobs integrated team that such events could be managed within the overall company objectives of outputs and spend for the year.

Reservoirs

The AMP5 programme included four new service reservoirs at Hindhead, Aylesford, Surrey Hills and Hale, with an estimated total value of £15.7m. The decision was made to bundle the delivery of these new reservoirs into a framework contract to provide efficiencies through the use of standard designs, reuse of modular form-work and pro-active engagement with the supply chain.

However, as part of the outline design phase, the Project Manager decided to investigate the opportunity of making efficiencies through a reduction in scope of the projects. A small modelling team from Jacobs and SEW was tasked with finding the optimum amount of storage required. This resulted in two of the reservoirs being removed from the scope by replacing them with pipeline projects utilising existing storage in the area, resulting in a significant saving to SEW. As a result, only Hindhead Reservoir (5ML) and Aylesford Reservoir (10ML) needed to be constructed.

Hindhead Reservoir was featured in full in UK Water Projects 2011.

New Sources and Borehole (BH) Works

To maximise the synergies and efficiencies in delivery all of the borehole projects were combined under one Project Manager and

Lot #	Site	Output
N/A	Tonbridge WTW	4.9ML/d
Lot 1	Deep Dean WTW	3.8ML/d
Lot 1	Cowwish WTW	7.5ML/d
Lot 1	Bray WTW	45ML/d
Lot 2	Barcombe WTW	75ML/d
Lot 2	Arlington WTW	23ML/d
Lot 2	Crowhurst Bridge WTW	11ML/d
Lot 2	Friston WTW	20ML/d
Lot 2	Greywell WTW	6.8ML/d
Lot 3	Hazards Green WTW	13.3ML/d



contractor. This approach, through the chosen contractor, Jacobs, is expected to realise a 15% saving over the AMP.

Using NEC Option E contracts, Jacobs is delivering the following elements of work:

Borehole Maintenance

- £5.7m investment over the AMP.
- Progress: 122 (No.) surveys completed, 61 (No.) borehole remediations undertaken, 25 (No.) borehole pumping tests completed, 1 (No.) hydrocarbon remediation completed, 2 (No.) new boreholes drilled and equipped.
- On track to meet all the AMP5 targets, ensuring South East Water's groundwater sources are maintained and its obligations to the Environment Agency are satisfied.
- Additional efficiencies have been established by using the same team to undertake reactive maintenance as and when required on boreholes across the region.

Security Emergency Measures Directive -BH Protection

- £8.6m over the AMP.
- All Department of Food, Environment and Rural Affairs (DEFRA) targets to date have been met and on track to meet the DEFRA targets for the remaining two years of the AMP.

Flood Mitigation

- £3.15m over the AMP.
- 83 of 138 sites have been protected.
- On track to meet AMP5 targets.

Water Mains

During the first year of the AMP, South East Water re-tendered its framework for capital water mains delivery along with its operational repair and maintenance and customer metering contracts. A single

contractor, Clancy Docwra, was appointed to undertake all the lots to realise significant efficiencies due to the synergies between the programmes.

Mains Renewals: The mains renewal programme is driven by asset condition and determined by a complex annual deterioration model, to define which parts of the network need replacing during the following year.

In the first three years of the AMP, the integrated delivery team has delivered over 126km of new main - outperforming the final determination granted by the water services regulation authority, Ofwat. In the last financial year, over 50km were delivered, a first for South East Water.

This success is due to a number of factors:

- *Drive to use more no-dig solutions.* During the first year the majority of mains replaced were laid using traditional open-cut techniques. During year three, over 65% of the mains were laid using less disruptive and faster no-dig techniques.
- *Use of Jacobs' integrated delivery model utilising resources in India.* Outsourcing parts of the design function to India has made significant savings for pre-construction works of around 20%.
- *Early engagement with stakeholders.* The key opinion formers, especially the local highways authorities are consulted more than six months in advance on the annual mains renewal programme.
- *Bundling of schemes at programme level.* One of the biggest successes in year three was the delivery of 7km of mains renewals in and round Wokingham Town Centre. Over a dozen schemes were bundled together and delivered, from the customer's perspective, as a single project.



October 2012: Wokingham mains laying scheme - Courtesy of South East Water

Strategic Supply/Demand Pipeline Schemes

In the first three years of the AMP the Integrated Delivery team has successfully delivered a number of major cross-country pipelines as part of South East Water's water resources programme. These include:

Riverhill to Kilnwood: This £2.4m scheme included the construction of a new 6.3km, 400mm diameter ductile iron main to increase connectivity between water resource zones. One of the major challenges on this project was the proximity of ponds supporting large populations of Great Crested Newts, meaning that newt exclusion fencing was required for the majority of the length of the pipeline.

Friston to Folkington: The main driver for this scheme was the successive dry winters in 2011 and 2012 which raised the risk of drought and water restrictions in the summer of 2012. This project enables the transfer of water to a particularly high drought risk resource zones connecting Friston WTW to Folkington Reservoir.

With accelerated delivery timescales, the 6.4km 400mm diameter main and high lift pumping station were delivered in just five months. The pipeline itself had significant environmental and archaeological constraints as it ran through the newly formed South Downs National Park. Special consideration also had to be taken for unexploded ordnance along the route - consequently, extensive surveys and watching briefs were undertaken during construction.

The £3.1m project was completed on time to enable the water transfer. In recognition of its success, the project was awarded 'Highly Commended' status in the South East Institution of Civil Engineers Excellence Awards in June 2013.

Oakhanger Schemes: In year one of the AMP a group of strategic pipeline projects was undertaken in and around the Oakhanger area of Hampshire. These schemes predominantly allow greater transfer of water to areas where demands from population growth has increased, but also to replace smaller failing assets. The scope included:

- 1.7km of 300mm diameter main.
- 1.6km of 250mm main.
- 2.1km of 300mm main.
- 4.3km of 400mm main.

Delivered as a package of work using NEC3 Option C by Clancy Docwra, the programme of projects was completed on time and overall, on budget.

Key successes

This innovative approach to project delivery has already realised a number of significant successes for the integrated delivery team and South East Water including:

- The use of off-shore resources and a matrix management approach reducing pre-construction costs by 20%.
- Ability to supplement the core team and call on specific expertise from a large external resource pool, when required.
- Provision of a robust programme management tool and procedures driving delivery and efficiencies and accurate forecasting to support reliability for funding the capital programme.
- Shared sense of ownership, celebrating successes and learning from issues together, maximising the opportunities provided by the integration of the teams from both Jacobs and South East Water.

The Editor & Publishers would like to thank Jacobs and South East Water for providing the above article for publication.



July 2012: Riverhill to Kilnwood Pipeline - Courtesy of South East Water



January 2013: Toasting a mains laying scheme near Faversham, Kent
Courtesy of South East Water



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