



## **Water Resources Forum, 31 January 2014**

### **Background information on forward work programme**

Over the 5 years from 2014 to 2019 we will undertake a number of studies to inform our future water resources plans. At the Water Resources Forum on 31 January 2014 we will outline the main work areas and seek delegates' input on both the scope of the planned work, and our engagement programme through 2014.

The work falls into three main areas, as set out below. Pages 1 and 2 include a summary of the work, while the following pages provide more detailed information.

## **EXECUTIVE SUMMARY**

### **1. Resource availability and future large scale resource development**

#### **Resource availability**

We currently use hydrological models to estimate the amount of resource that is available for water supply. We are now working to improve the models and to review the underlying data, which will provide greater transparency and as well as improving certainty in our estimates of the water that is available. We are working with the Environment Agency (EA) and stakeholders as we undertake this work, and plan to share the findings with the Water Resources Forum and seek your input as part of the process.

#### **Further investigation of large-scale water resource options**

In the medium and long-term we forecast a deficit between supply and demand, not just for our region, but for the South East as a whole, and a new large resource scheme is highly likely to be required. Our revised draft Plan identifies that a scheme will be required in 2027.

Considerable work has already been completed to assess the resource options – but there are a number of aspects that require further examination. These further investigations will involve detailed studies to identify the best value large water resource option to meet the long-term water supply needs in Thames Water supply area and also the South East.

### **2. Future uncertainties and sustainability reductions**

#### **Future uncertainties**

There is a wide range of uncertainties which affect our future water resource plans, including population growth, climate change and abstraction reform. We have considered these through sensitivity testing of our future plans, by examining how our plans perform in the event that the impact of these factors is greater or less than currently predicted. Further work is required to examine these uncertainties and the resilience of our water supply system.

#### **Sustainability Reductions**

Sustainability reductions are reductions in abstraction that are required to provide environmental improvements, typically through increased flows in rivers which are identified as suffering from low flows due to the effects of abstraction. The Environment Agency provided companies with information on reductions in abstractions that will be needed to protect watercourses as part of the process of preparing water resource plans. Further work is now needed to determine what abstraction licence reductions will be needed.

### **3. Measures to reduce demand**

#### **Evaluating the effectiveness of demand management**

Demand management - through leakage reduction; metering and water efficiency - makes up the majority of our planned activities to ensure we have enough water over the next 5 years. However, the savings delivered by these activities are not fully within our control, as they depend to a significant extent on the actions of others, so it is important that we monitor and evaluate the benefits of these activities to assess the impact they are having.

#### **Water tariffs**

We have proposed the introduction of sophisticated tariffs from 2020 to reduce discretionary water use. We recognise the importance of customer engagement in the design and implementation of such tariffs, and that this will be crucial in building and maintaining customer confidence. We plan to undertake trials to explore the different pricing tariffs; test customers' views on tariff types, forecast savings, monitoring of savings and analysis of the impact of tariffs.

## **DETAILED PLANS**

### **1. Resource availability and future large scale resource development**

#### **Lower Thames Operating Agreement and Control Diagram**

Fundamental to the operation of London's water supply is the control of abstraction upstream of Teddington Weir, the lowest point on the freshwater Thames. The strategy for the control of abstraction is set out in the Lower Thames Operating Agreement (LTOA). The Lower Thames Control Diagram (LTCD) is the operating tool within the LTOA which provides the day-to-day rules for managing the abstraction process.

One of the key pieces of work for us will be to optimise the LTCD. This is a detailed and complex task, which we will undertake with the EA. We have commissioned Cascade Consulting to undertake the following assessments to help to progress this work:

- Considering environmental criteria to be used in the optimisation
- Reviewing alternative LTCDs for environmental effects
- Formulating an aquatic environmental effects appraisal framework

#### **Further investigation of large scale water resource options**

Although wastewater re-use has been identified as our preferred option on the basis of current knowledge, a large number of uncertainties remain. These include cost; technology choice; performance and resilience in the face of the forecast impacts of climate change on drought severity, and other future challenges.

We have also received a large number of representations on future water resource options through our consultation on future plans.

Over the next 5 years we intend to undertake detailed studies to ensure the best value solution is selected for inclusion in our next water resource plan in 2019. These studies will cover the following areas:

- Wastewater re-use
- Reservoir storage
- Transfers, including potential third party water supply options

An outline programme of work is set out below:

### **Phase 1 April 2014 – April 2015**

- Critical review of options following the representations to the public consultation; inclusion of new options; consideration of potential variants emerging from on-going work.
- High level comparison of options, considering engineering scope and risk, cost, frequency and duration of operation; environmental and recreational impacts and benefits, planning risk and promotability; and operational risk.
- Development of stakeholder engagement process.
- Consideration of customer perception of options.

### **Phase 2 April 2015 – August 2016**

- Main phase of investigation of large resource options (storage, transfers, wastewater re-use, third party schemes) to improve the understanding of the engineering scope of the schemes, operational risks and environmental impact.

### **Phase 3 August 2016 – August 2017**

- Update of cost estimates for all constrained options including capital, operating and environmental and social costs.

### **Phase 4 January 2018 – April 2020**

- Following completion of the investigations and consultation under Phases 1 to 3, a short list of options will be defined. WRMP19 will then indicate which preferred option will be taken to design stage and planning and further consultation.

## **2. Future uncertainties and sustainability reductions**

To develop our water resource plan we used collaborative research to assess the performance of our preferred plan – which includes wastewater re-use - against alternative plans, one including a transfer from the River Severn, and one including a storage reservoir on the Upper Thames.

These large water supply options were evaluated against a range of reliability, cost and environmental metrics, and future climate change and socio-economic scenarios. The work indicated that as clearer climate change trends and energy price signals emerge over the next five years, the baseline costs and benefits, reliability and risks associated with the different large water resource options will change.

It is vital that we maintain an adaptable approach, and avoid locking ourselves into a plan which may be the least cost option today but could prove to be very expensive and less reliable under some potential future scenarios. We intend to continue to develop and enhance sophisticated modelling tools that help us assess alternative water supply strategies against a wide variety of performance measures, and given many different possible futures.

## **Climate Change**

Climate change could have a significant effect on the availability of water for London, through a combination of the impact on both the quality and quantity of water available. Critically, there are some limitations to the methodology currently used to determine the impacts of climate change, particularly with respect to understanding the resilience of the water supply system to different types of droughts that might occur under climate change, such as longer and more widespread droughts.

The 2010-2012 drought exposed potential weaknesses in the existing processes for assessing the impact of climate change on supplies, in that simply perturbing the historic record of rainfall and evaporation may not adequately reflect how the system might respond to multi-year droughts not present within that record.

We may, as a result, see a situation in which the impact of an extended drought is so great that severe restrictions on water use are needed in the capital, with severe economic and social consequences. While the likelihood of such an event is low, the impact would be very high both for the capital, and the country as a whole. We are, therefore, planning further research to investigate this risk and to examine the resilience of the water supply system.

## **Sustainability Reductions**

- Lower Lee (100 MI/d). *Further details below.*
- Lower Thames (50 MI/d). *Further details below.*
- North Orpington (9MI/d)
- Bexley (9MI/d)
- Sundridge (8MI/d)
- Waddon (7MI/d)
- Childrey Warren (3.7 MI/d)
- Ogbourne (3.5 MI/d)

## **Lower Thames Investigation**

An investigation has been completed to assess whether the existing abstractions and their control through the Lower Thames Operating Agreement (LTOA) are having a significant adverse impact on the environment, taking into account effects on environmentally protected sites and species; regulatory requirements (European Directives and national regulations) and our statutory duties in relation to provision of water supply.

It concluded that there was a significant impact on flows from the abstraction, and that this had the potential to have an adverse impact on the environment in the Thames Tideway.

The EA subsequently asked us to undertake a study to determine the options that could mitigate the impact of abstraction, and a long list of 31 potential actions was compiled, reviewed and their feasibility, likelihood of success, environmental sustainability, cost range and impact assessed.

This concluded that:

- Changes to our abstractions are not cost beneficial options
- The injection of Hydrogen peroxide/oxygen/air to the effluent at Mogden STW is considered to be cost beneficial.
- The use of boats to inject oxygen to the river is not considered to be cost beneficial
- Managing invasive species is considered cost beneficial.
- A navigation communication plan has no net positive or negative cost benefit.



The EA has requested that we put in place options to mitigate the impact of our abstractions and we have included an allowance in our Business Plan submission for detailed investigations looking at the feasibility of the different options, at a cost of approximately £10m.

### **Lower Lee investigations**

Abstractions at Enfield Lock and Chingford Reservoirs New Gauge have been identified as contributing to low flows in the River Lee. In conjunction with the EA the following objectives have been defined:

- To understand the hydrological nature of the Lower Lee, from Feildes Weir to the confluence with the Thames.
- Investigate the impact of abstraction on flows, morphology, ecology and water quality.
- Develop options to improve the hydrology and ecology of the river.

### **3. Measures to reduce demand and the risks**

#### **Evaluating the effectiveness of demand management**

Of the 150 Ml/d deficit in London by 2020, 106 Ml/d is removed through measures to manage demand. While we are committed to ensuring the effective use of resources and to managing demand, the benefits are not fully in our control.

We intend to monitor the water savings achieved through the demand management programme and report performance in an Annual Review. This approach will ensure that we identify any shortfall and are able to act to mitigate it. We do have some contingency schemes available, although they are only a relatively small proportion of the savings we envisage through demand management.

#### **Water tariffs**

Our plans include the introduction of innovative tariffs in London in 2020-2025. This is the first time water tariffs have been considered for introduction on a large scale in the UK, and there are many aspects which require detailed exploration. Innovative tariffs may not be supported by customers and/or, given the relatively low marginal cost of water, their use may be found to be inelastic to pricing structures.

We plan to undertake trials to explore the use of pricing tariffs in AMP6 (2015-2020). These will test customers' views on tariff types, forecast savings, monitoring of savings and analysis of the impact of tariffs on usage. If tariffs are not accepted by customers, or do not significantly affect usage, this may result in the need to bring forward large water resource schemes by c.3-4 years in the plan (c.2023-2027).