





READING BOROUGH COUNCIL

REPORT BY DIRECTOR AND COUNCIL MANAGER

TO:	MEMBERS OF THE EXTERNAL OVERVIEW & SCRUTINY COMMISSION (SCRUTINY REVIEW EVIDENCE SESSION)		
DATE:	29 NOVEMBER 2012		
TITLE:	SCRUTINY REVIEW OF WATER SECURITY		
SERVICE:	LEGAL AND DEMOCRATIC SERVICES	WARDS:	BOROUGHWIDE
SCRUTINY REVIEW CHAIR:	COUNCILLOR T JONES	AREA:	EXTERNAL OVERVIEW & SCRUTINY
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1. EXECUTIVE SUMMARY

1.1 This informal meeting of the members of the External Overview & Scrutiny Commission (EOSC) is an evidence-taking session for the scrutiny review of Water Security.

1.2 The aims of the review are to examine:

- the extent to which the local and regional infrastructure for the supply and storage of potable water is sufficient for current and projected future demand;
- the extent to which the local waste water system is also sufficient for current and projected future demand;
- how the Council and partners can help reduce demand and promote water efficiency.

1.3 A number of organisations with an interest in water security and members of the Reading Climate Change Partnership Board were invited to submit written evidence and attend the session. Written submissions from seven organisations are attached to this report (see section 5).

1.4 Representatives of Thames Water will give a presentation at the meeting.

2. RECOMMENDED ACTION

2.1 That EOSC members consider the written and verbal evidence.

2.2 That EOSC members identify next steps for the review.

3. POLICY CONTEXT AND BACKGROUND

3.1 At the EOSC meeting on 10 July 2012 it was agreed to carry out a scrutiny review of Reading's water security and water management. The EOSC meeting on 12 September 2012 received a draft scope for the review and agreed to hold evidence-taking sessions.

4. WATER SECURITY

National context

4.1 Water is a resource that faces increasingly severe and often conflicting pressures, and the pressure on water resources is likely to increase as a result of climate change and increasing demand through population growth. There is evidence that the way we use water and manage our water resources needs to change, and that careful planning will be critical to ensure sustainable water supplies and protect the environment, support economic growth and secure supplies for households.

4.2 A recent Environment Agency report<sup>1</sup> on current and future water availability modelled water availability in the 2050s and made the following conclusions:

- Water resource availability in the future is uncertain.
- The water environment will be different from that of today.
- The combined impacts of climate change and increases in population show there could be less water available for people, businesses, agriculture and the environment than today.
- Future water resource availability pressures will not be limited to the south and east of England.
- Over the longer term climate change could have a bigger impact on water resource availability than population growth. Unmet demand is more closely linked to the climate change scenarios than the demand scenarios.
- Demand management will have an important role in the future but increased demand and climate change impacts could result in the need for significant new resources to be developed.
- The scale of the problem needs to be considered at a strategic and local level.

4.3 DEFRA's 'Water for Life' White Paper considers these scenarios and concludes that, while we cannot provide firm forecasts of the impact climate change will have on our water supplies, or the extent to which demand will increase, we can be confident that the way we manage and use our water resources will have to change, and that the financial, environmental and

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<sup>1</sup> The case for change - current and future water availability

carbon costs of continuing to simply predict future demand and build capacity to meet it would be too high.

#### Regional and local context

- 4.4 Reading is at the heart of a growing regional economy, and is the centre of a wider 'functional economic area' that attracts significant inward investment from businesses drawn to the area by the availability of a highly skilled workforce, knowledge intensive business clusters and access to transport hubs. This brings continuing demand for more housing and commercial development and consequently extra demand for domestic and business water supply and treatment.
- 4.5 Reading is situated in the Kennet Valley Water Resource Zone (WRZ) and the water and wastewater services company are Thames Water, who have a legal duty to provide a secure supply of safe and clean water. They are required to produce a Water Resources Management Plan (WRMP) every five years, which sets out how they plan to provide water to meet customers needs while protecting the environment over a 25-year period.
- 4.6 Thames Water's 2010-2035 water resources management plan notes that, during the development of and consultation on the plan, key areas of interest for stakeholders with respect to water resources were the need to maintain security of water supply, wide support for continued investment to achieve further reductions in leakage and support for greater efforts to manage demand through the promotion of water efficiency and metering.

#### Role of local authority scrutiny

- 4.7 Previous local authority scrutiny on 'water' issues has often been prompted by concerns about flooding and surface water management, specific proposals for local infrastructure such as reservoirs, or following a significant period of drought. The initial scope of this review is more general, and members are invited to identify what, if any, specific areas there are that the review can usefully investigate further and develop recommendations.
- 4.8 In considering next steps members may like to note a prediction that local authorities will have an increasingly significant role in water resources management, such as through promoting water efficiency in the planning and development process, and developing and communicating messages about water efficiency<sup>2</sup>.
- 4.9 This scrutiny review could also provide a basis for the Council to respond to consultation on Thames Water's 2015-2040 Water Resources Management Plan, which is currently being developed and is due to be published for formal public consultation in April 2013.

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<sup>2</sup> Environment Agency - Water for people and the environment (Water Resources Strategy for England and Wales)

## 5. WRITTEN EVIDENCE

- 5.1 A range of organisations were invited to submit written evidence addressing the three aims of the review. Seven submissions have been received, as follows:

<u>Appendix</u>	<u>Page</u>	<u>Submitted by</u>
I	5	Thames Water
II	20	Environment Agency
III	24	Walker Institute for Climate System Research, University of Reading
IV	26	Reading Friends of the Earth ('Built and Natural Environment' theme lead on the Reading Climate Change Partnership Board)
V	29	Peter Brett Associates (business representative on the Reading Climate Change Partnership Board)
VI	31	Kyocera Mita (business representative on the Reading Climate Change Partnership Board)
VII	33	A member of the Group Against Reservoir Development

## 6. CONTRIBUTION TO STRATEGIC AIMS

- 6.1 This review of Water Security contributes to the strategic aim to develop Reading as a Green City with a sustainable environment and economy at the heart of the Thames Valley, and links to the Place theme in the Sustainable Community Strategy.

## 7. LEGAL IMPLICATIONS

- 7.1 None arising from this report.

## 8. FINANCIAL IMPLICATIONS

- 8.1 The scrutiny exercise will be funded from within the scrutiny budget.

## 9. BACKGROUND PAPERS

### 9.1 References:

- Environment Agency - Water for people and the environment (Water Resources Strategy for England and Wales)
- Environment Agency - The case for change - current and future water availability
- Thames Water - Water - planning for the future (water resources management plan 2010-2035)
- Reading UK CIC Economic Development Strategy



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## **Thames Water Utilities**

Review of Water Security and Water Management  
in Reading

Reading Borough Council Scrutiny Committee  
29 November 2012

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## **The extent to which the local infrastructure for the supply and storage of potable water is sufficient for current and projected future demand**

### **1. Background**

Thames Water has a duty to maintain the security of water supply to our 8.9 million drinking water customers in London and the Thames Valley, supplying an average of 2,600 million litres of water per day.

In our Kennet Valley Water Resource Zone (WRZ), where Reading is situated, we supply 380,000 customers with an average of 145 litres per head per day.

It is our duty to produce a Water Resources Management Plan (WRMP) every 5 years, which set outs how we plan to provide water to meet customers' needs while also protecting the environment.

### **2. Current and Projected Water Demand**

To plan water resources effectively for the future we forecast the amount of water that our customers will require, and the volume we need to put into supply.

“Demand” describes the amount of water entering our distribution network and comprises domestic or household consumption, commercial or non-household consumption, and leakage or losses from the distribution network and customers' supply pipes.

We follow the industry best practice demand forecasting methodology. This forecasting is calculated by incorporating many different factors, one of which is an assessment of increasing populations/properties in our area of supply. Our current Water Resource Management Plan (WRMP) covers the planning period 2010-2035.

In general terms “Supply” describes the amount of water we are permitted to take from the environment, for example from rivers and groundwater boreholes. All of our abstraction points are licensed by the Environment Agency, and the licences contain limits to the volume of water which can be removed.

To forecast security of water supply, an assessment of both supply and demand data is made. The Kennet Valley WRZ does not have a forecast imbalance in supply and demand; indeed the area has a forecast water surplus throughout the 25-year planning period.

### **3. Leakage**

Leakage reduction remains our highest priority, and we have met our company-wide target for the sixth consecutive year. Leakage has been reduced to its lowest ever levels in recent history. Currently we detect and repair between 70,000 and 80,000 leaks per annum across our supply area.

During this 2010-2015 period, we will be investing £6.9 million in resolving leaks and in mains replacement across the catchment.

## Review of Water Security and Water Management in Reading

During the last year we have been replacing poorly performing mains in the Reading area in order to restore the infrastructure to a more sustainable level. We have also delivered a large number of new pressure management schemes in the area to reduce the rate of leakage.

For visible leaks we already achieve short repair times, with many being completed within 24 hours of being reported. The company, working closely with officers from Reading Borough Council aim to continue to achieve these fast turnaround times, despite increasing restrictions being imposed by the Traffic Management Act.

We estimate that approximately one quarter of leakage comes from supply-pipe leaks from customers' own pipes. We continue to offer a subsidised leak repair and relay scheme for our domestic customers. Thames Water has also developed with commercial partners a device called *Leakfrog* which can be fitted to existing water meters. The *Leakfrog* is specifically designed to identify properties that show signs of leakage or wastage quickly and clearly. While this has been designed to provide a solution to the 'needle-in-a-haystack' problem of finding and fixing customer-side leakage, it also provides categorical information about the size and location of leaks or whether there are no leaks at all.

### 4. Water Use Restrictions

It is a common misconception that south east England has sufficient rainfall and that hosepipe bans are frequent. In reality, neither is true. The 2012 hosepipe ban was the first one for six years in our area, and rainfall in London is lower per capita than in places like Rome, Dallas and Istanbul.

In planning future water resources we work to agreed levels of service for our customers. The levels of service state the average frequency with which we can impose different types of water use restrictions during periods of water shortage, and are agreed with Ofwat and the Environment Agency. Table 1 shows the levels of service and the different types of action we will take in drought situations. As the severity of a drought increases, the actions we take have an increased impact on both the amount of water available to customers and that taken from the environment. In the most serious drought situations, this can include restricting customers' water use.

Table 1: Levels of Service in Drought Situations.

Level	Action	Frequency of Occurrence
1	Intensive media campaign	One year in five on average
2	Sprinkler/unattended hosepipe ban, enhanced media campaign	One year in 10 on average
3	Temporary Use Ban (formally hosepipe ban), Drought Direction 2011 (formally non-essential use bans) requiring the granting of an Ordinary Drought Order	One year in 20 on average
4	If extreme measure (such as standpipes and rota cuts) were necessary their implementation would require the granting of an Emergency Drought Order	Never

We have conducted research to understand customer preferences in relation to levels of service. The main findings were that customers wish to avoid severe

restrictions on water use during droughts, but were willing to tolerate occasional hosepipe bans when necessary.

## **5. Metering**

The company's preferred method of charging customers for water is via a meter, as we believe this is the fairest way to pay for water.

Thames Water has a continuing programme of what we call optant metering, where customers can opt for the installation of a meter. The total number of optant meters installed across the Thames Water area in 2011/12 was over 36,800 (13,000 more than 2010/11). This increase has principally been achieved through an ongoing initiative to identify customers who could financially benefit from having a meter installed, and then writing to them promoting the free meter option scheme.

In the summer of 2012, Thames Water was granted legal powers to introduce compulsory metering by the Secretary of State for the Environment. Compulsory metering offers a more cost effective solution as installations can be done on a street by street basis, rather than targeting individual properties who have requested a meter. During this five year period (2010-2015) we propose to install up to 86,000 compulsory meters within the Thames Water supply area.

The use of compulsory metering will play an important role in demand management and will initially focus on areas of greatest water stress (London and Swindon & Oxfordshire WRZs). It is expected that compulsory metering will be introduced from 2020 into the Kennet Valley WRZ which has a water surplus.

We recognise affordability is a critical issue. Compulsory metering will have potentially adverse consequences, particularly for larger households in low rateable value properties, and could produce significant increases in water and sewerage bills. Thames Water is working with Defra, the Consumer Council for Water and Ofwat to develop social packages to mitigate these impacts at an acceptable level of cost.

In the Kennet Valley WRZ where leakage is already low and reduction is not such a driver for investment, metering and water efficiency initiatives will be carried out in tandem.

Thames Water's Water Resources Management Plan 2009 can be found at the website address below:

<http://www.thameswater.co.uk/about-us/5392.htm>

**The extent to which the local waste water system is also sufficient for current and projected future demand**

**6. Background**

The Reading catchment is located within the county of Berkshire, approximately 40 miles directly east of London, comprising Reading town itself and the villages of Theale, Bradfield, Sonning, Play Hatch, Englefield, Padworth and Shinfield.

The Reading catchment has mainly separate foul and surface water sewers, with a few small combined areas. The catchment comprises approximately 559 km of foul sewers draining the catchment from north to south. All foul flows drain via 3 main pumping stations to the new Reading Sewage Treatment Works (STW) located in the central-southern part of the catchment. The 3 pumping stations discharging directly to the STW are Blakes Lock Sewage Pumping Station (SPS), Cow Lane SPS and Circuit Lane SPS. Treated effluent from Reading Sewage Treatment Works is discharged into the Foudry Brook and then on to the River Kennet.

The catchment comprises approximately 471 km of surface water sewers draining the catchment to the River Thames, River Kennet, Holy Brook, Foudry Brook, Gunter's Brook, the Kennet & Avon Canal and other various brooks and unclassified land drainage. The surface water sewers generally are spread out fairly uniformly over the Reading catchment. However, there are small pockets of areas where surface water sewers are not evident.

**7. Flooding**

Hydraulic Flooding<sup>1</sup>

Hydraulic flooding is a significant issue in the Reading catchment. Flooding incidents analysed show the majority is clustered in the Queens Road, The Grove, Longworth Avenue, Overdown Road, Keswick Close, Chapel Hill and Stone Street.

There are a number of schemes that have either been recently completed, are underway or earmarked to alleviate this flooding including the larger cluster flooding. Assessment has shown that some proposed developments are upstream of historic flooding and the implemented remedial schemes. The ability of the flood solutions to cope with these extra upstream flows should be analysed in more detail as further work may be required or an alternative route for development flows suggested.

Non-hydraulic Flooding<sup>2</sup>

There are reports of non-hydraulic flooding in the Reading catchment and these are randomly spread across the catchment. Overdown Road, Queens Road and Whitley Wood Lane report the highest repeat flooding. A number of these properties are currently under investigation. These also occur in areas which have experienced multiple blockages.

Infiltration<sup>3</sup>

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<sup>1</sup> Flooding related to the capacity of water that a sewer can accommodate.

<sup>2</sup> Flooding due to other causes such as blockage by Fat Oil and Grease or tree roots.

<sup>3</sup> Unintended ingress of water flows, for example due to poor sewer joints

There have been reports of infiltration problems but no formal infiltration studies have been undertaken in the catchment. A few locations were reported as subject to infiltration in Aldermaston Wharf, Theale where there are properties on the Thames Water risk register.

## **8. Operations**

### Blockages

Fat Oil and Grease (FOG) is a known issue within this catchment with 48% of the blockages attributed to FOG causes. Educational FOG visits have been carried out at multiple establishments, mainly in Friar Street, Broad Street, London Road, Oxford Road and others around Reading town centre, to provide information and to help to reduce the number of blockages. These specific roads have experienced a high number of blockages within the last 5 years, and non-hydraulic flooding has been recorded in Oxford Road. A continued FOG visit programme within targeted areas of the catchments is proving to be beneficial.

### Recent works

Recent sewer collapses have occurred in Blagrove Street and in Friar Street. Blagrove Street has now been repaired and work has since started on Friar Street. This work is expected to take 4 months to complete as several water mains will also need to be moved to enable us to reach the sewer.

## **9. Compliance**

### Discharge Consents

We are happy to report 100% compliance with wastewater for all our Sewage Treatment Works for the 5th successive year. Reading STW is also fully compliant with its discharge consent as agreed with the Environment Agency.

### Pollution Incidents

We have regrettably experienced an increase in pollution incidents across all regions of the company and this is an industry-wide issue. There are many reasons for this including the adoption of private sewers and a change to the categorisation / reporting of incidents.

An improvement plan is in place and being regularly reviewed by our regulators. Specifically within the Reading BC area we have had 12 reportable pollution incidents this calendar year.

## **10. Sewage Treatment Capacity**

Reading Sewage Treatment Works' treatment capacity was designed to serve a population of approximately 300,000. The current population served is approximately 205,000. There is, therefore sufficient capacity to treat additional load through the effluent stream.

## Review of Water Security and Water Management in Reading

In summary Reading STW (Island Road) has spare capacity for known growth up to 2020 following the closure of the Reading Brewery.

## **How the Council and partners can help reduce demand and promote water efficiency.**

### **11. Water Efficiency**

Reading Borough Council and its partners can help to promote Thames Water's water efficiency offer that is available to all TW supply customers. This offer comprises:

- water wisely on line usage calculator
- free self install water efficiency goods available via the web site or via coupon
- schools educational materials and volunteer talks available via the web site e.g. Top Trump cards
- Steps To Sustainable Water use packs for non-domestic customers giving advise on optimising water use in the workplace

Existing and proposed council marketing sent to local residents can be used to help promote the free water efficiency offers to both domestic and non-domestic customers.

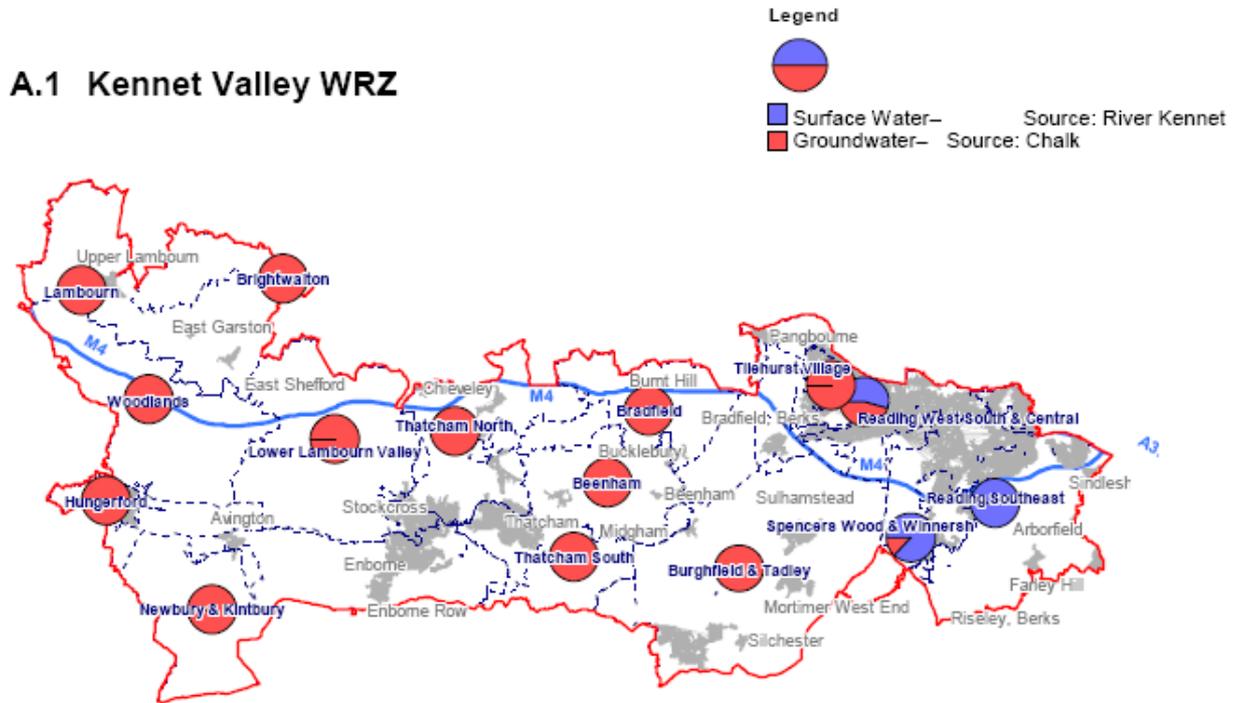
Reading Borough Council and its partners can incorporate water efficiency measures into their tenanted properties maintenance programmes. This would involve the installation of our range of free water saving goods. We can provide internet access to its bulk ordering system established to support its partner's water efficiency work. We can also provide training for personnel responsible for the installation of the water saving goods. A similar offer of free goods and installation training can be promoted to all landlords in the Borough to help improve rented properties' water efficiency.

Our water efficiency team is presently working with a number of large sites in Reading to study how best to deploy Automatic Meter Reading (AMR) equipment to help us better understand water usage. Test sites include Reading University. The work at the University is being used to study the design of AMR presentation tools and learn how to best engage with staff and students to help drive water efficiency behaviour change. A similar project is being delivered with Thames Valley Police, involving work at Reading Police Station as well as others in the County. Several of our own offices in Reading: Clearwater Court, Rosekilm Court and Kemble Court are also part of this study. The project is a larger and more in-depth version of the work that was offered to the Council for its schools in July.

Reading Borough Council can agree to the proposed schools project offered to the council in July. The project with Reading Schools proposed starting with 10 – 20 in the current year. The project proposed a water efficiency review of the first group of schools linked to educational support delivered in conjunction with AMR equipment. The work would be used to study how AMR can best be used to inform water efficiency in the schools and how the equipment can be used to drive behaviour change in the schools.

Appendix 1

Kennet Valley Water Resource Zone



## Appendix 2

### Capital schemes in Reading

Project/Programme Name and Brief Description	Indicative Start Month	Indicative End Month	Additional Comments
<p>Queens Road</p> <ul style="list-style-type: none"> <li>• Removal of risk properties from the sewer flooding history database.</li> <li>• New sewers, connections, pumping stations and storage tanks.</li> <li>• Involving works in Queens Road, Livery Close, The Grove, South Street, Bourne-Stevens Close &amp; East Street.</li> </ul>	January 2013	May 2013	
<p>Mains Replacement &amp; Renovation</p> <ul style="list-style-type: none"> <li>• Replacement of distribution mains with a history of water quality issues or a significant burst risk.</li> <li>• These are reactive projects, with mini-programmes of works released by Asset Management throughout AMP5.</li> <li>• Current programme includes Wychwood Crescent/Wilderness Road, which is in Reading but falls under Wokingham HA.</li> <li>• No other locations identified in RBC at the moment, but as this is a reactive programme there may be in the future.</li> </ul>	August 2011	March 2015	
<p>Tilehurst 02 Victorian Mains Replacement</p> <ul style="list-style-type: none"> <li>• Reduction of leakage from distribution mains.</li> <li>• Remaining works to be agreed.</li> <li>• Queen Victoria Street, Merchants Place, Garrard Street, Blagrove Street, Station Hill, Union Street, Valpy Street, The Forbury, Caversham Road (Northbound), Stanshaw Road, Tudor Road, Station Road, Friar Street, West Street &amp; St Marys Butts.</li> </ul>	February 2011	January 2015	Working with James Penman (Reading Borough Council ) to programme works around resurfacing programme
Keswick Close, Tilehurst	October	July 2014	

## Review of Water Security and Water Management in Reading

<ul style="list-style-type: none"> <li>• Removal of risk properties from the sewer flooding history database.</li> <li>• Construction of mini pumping stations and sewer improvements.</li> </ul>	2013		
<p>Trunk Main Leakage</p> <ul style="list-style-type: none"> <li>• Reactive works to repair trunk water main leaks.</li> <li>• No locations identified in RBC at the moment. but as this is a reactive programme there may be in the future.</li> </ul>	July 2012	March 2015	
<p>Blagrove Street Sewer Collapse</p> <ul style="list-style-type: none"> <li>• Sewer Renovation - Off line repair of deep 225mm dia foul sewer in centre of Reading;</li> </ul>	June 2012	November 2012	Construction complete. QR code and texting facility used as means of keeping residents
<p>Friar Street, Reading.</p> <ul style="list-style-type: none"> <li>• Following recent collapse of sewer, this emergency works are being carried out to repair the sewer.</li> </ul>	On-site	tba	Investigations ongoing but 4 months work is expected
<p>Exlade Street (Woodcote) SPS),</p> <ul style="list-style-type: none"> <li>• Rising Main (pumped sewer) replacement.</li> </ul>	March 2012	December 2012	Construction completed early.
<p>Grazeley Road, Three Mile Cross –</p> <ul style="list-style-type: none"> <li>• Sewer Renovation - Sewer upsizing to cope with development.</li> </ul>	January 2013	May 2013	
<p>Earley Reservoir –</p> <ul style="list-style-type: none"> <li>• New service reservoir with additional storage capacity of 15 million litres</li> </ul>	tba		Although this is outside Reading BC boundary, it does feed Reading's population.
<p>Pangbourne Water Treatment Works –</p> <ul style="list-style-type: none"> <li>• Electrical upgrade and flood resilience.</li> </ul>	tba		Although this is outside Reading BC boundary, it does feed Reading's population.
<p>Fobney Water Treatment Works</p> <ul style="list-style-type: none"> <li>• New sand washing plant with new clean sand and GAC storage areas</li> <li>• Refurbishment of intake cup screen drive</li> <li>• New sand handling bridge</li> <li>• New chemical delivery bay for sodium hypochlorite and sodium bisulphite</li> <li>• Refurbishment of oxygen</li> </ul>	tba		

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<p>storage, ozone facility and sodium bisulphite facility</p> <ul style="list-style-type: none"> <li>Upgraded chemical storage facilities for sodium hypochlorite and sodium bisulphite</li> </ul>			
<p>Fobney WTW</p> <ul style="list-style-type: none"> <li>New SSF instrumentation</li> </ul>	February 2011	Completed September 2012	Project is primarily refurbishment or replacement of existing facilities to ensure continued serviceability and quality of water production
<p>Fobney WTW</p> <p>Provision of flood protection facilities to protect selected critical assets on site against flood water levels during a 1:100 (+ 20% for climate change) fluvial and 1:100 (+ 20% for climate change) pluvial flood events.</p>	February 2011	Completed March 2012	Replacement of existing unserviceable instrumentation to provide improved control and operation of the SSF's to ensure continued water quality.

## **Appendix 3**

### **Climate Change**

A review of Thames Water's preparedness for the impact of climate change was submitted to Defra in January 2011. The direction to report was driven by the Climate Change Act 2008. Since this work was completed we have continued to develop our response to climate change incorporating feedback from Defra and other stakeholders.

As a business, we have engaged widely with our stakeholders, including Reading Borough Council to seek views on issues including climate change and the priority that we should give to these issues in the next five-year period between 2015 and 2020 and to include in our forthcoming Price Review consultation called 'Making the most of the essential service'.

We have also provided comments on the 'Reading Means Business' consultation on the 8th of October 2012.

## Appendix 4

### Emergency procedures

The Security and Emergency Measures Direction 1998 (SEMD) requires us to have plans in place to provide water by alternative means should the piped supply fail.

In the guidance<sup>1</sup> accompanying SMED, an emergency event involving the loss of water supply is split into two categories:

1. an incident of a size that the response is within the capabilities of the company together with assistance from other agencies;
2. a major incident of a size that is greater than the response capability of the company even with any mutual aid. Such an incident would constitute a civil emergency and would lead to a multi-agency response.

We have contracts and arrangements in place to meet our obligations for the first of these and are working closely with Reading Borough Council and other resilience partners with regard to the second.

For us, this means that we have plans in place to deliver a minimum of 10 litres of potable water per person in every 24 hour period to the following populations:

- Urban environment: 30,000 within 24 hours and 50,000 within 3 days
- Rural environment: 15,000 within 24 hours and 25,000 within 3 days

In the case of Reading, this would be deemed as a rural environment.

For a prolonged event of more than 5 days, the volume of water would be increased to 20 litres per person.

During an interruption to supply event, we would always attempt to keep as many customers as possible with water and this would be done as much as we can by using our own network. This could at times have an impact on water pressures in areas not directly affected by the initial problem.

<sup>1</sup> SMED Advice note 9.

**The extent to which the local and regional infrastructure for the supply and storage of potable water is sufficient for current and projected future demand**

Every water company is responsible for developing and maintaining an efficient and economical system of water supply within its area.

A water company must produce and maintain two important documents to show how it will supply under drought conditions, and under dry conditions over the next 25 years:

- **Water resources management plan**<sup>1</sup> – A water resources management plan must show how the water company forecasts supply and demand over the next 25 years. If this shows a deficit it must appraise the options available to it and show what actions it will take to maintain supply. The company must review its plan annually and send a statement of the conclusions of its review to the Secretary of State.
- **Drought plan**<sup>2</sup> – A drought plan sets out the short-term operational steps a company will take before, during and after a drought.

Both of these documents are available on the company's website (please see footnotes).

As the Government's technical advisor, we produce the Water Resources Planning Guideline<sup>3</sup> and the Drought plan guideline<sup>4</sup> (see footnotes) As a statutory consultee we review both plans and provide a formal response to the company. The comments will cover any issues we consider relevant and will be set against the context of the Government's policy position for managing water resources.

Once the statement of response is published, the Environment Agency provides technical advice to the Secretary of State and Welsh Ministers to help them decide on the next steps.

The evidence requested from the Environment Agency is likely to cover:

- whether the plan meets the statutory requirements;
- whether the company has properly addressed the representations received;
- whether or not the changes proposed to the plan in the statement of response are significantly different to the draft on which the company consulted on;
- the improvements the Environment Agency advises should be made to the plan.

**Kennet Valley resource zone**

Reading falls into Thames Water's Kennet Valley water resources zone, which supplies approximately 380, 000 people. A resource zone is an area where water can be moved around the zone so that customers within the zone are all at approximately the same risk of failure of supply. The map below shows the sources of water in the resource zone.

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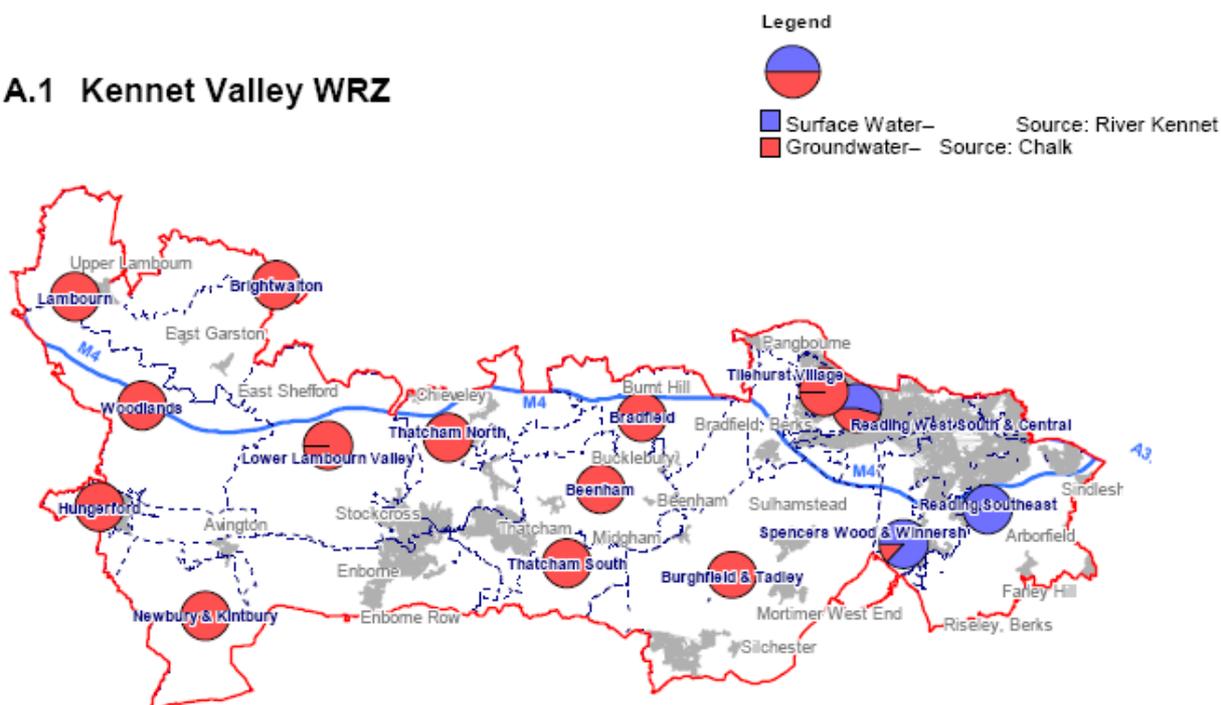
<sup>1</sup> <http://www.thameswater.co.uk/about-us/5373.htm>

<sup>2</sup> <http://www.thameswater.co.uk/about-us/11092.htm>

<sup>3</sup> Water resources planning guideline - <http://www.environment-agency.gov.uk/business/sectors/39687.aspx>

<sup>4</sup> Drought plan guideline - <http://www.environment-agency.gov.uk/business/sectors/123024.aspx>

## A.1 Kennet Valley WRZ



Thames Water published its final water resources management plan in April 2012. This plan showed that the Kennet water resources zone currently has a surplus of water in a ‘dry year’ and in a peak week of water demand in the dry year. A dry year is defined as highest yearly demand for water before drought restrictions such as ‘hosepipe bans’<sup>5</sup> are needed. The surplus is approximately 30 MI/d<sup>6</sup> average in a dry year, and 20 MI/d in a peak week throughout the next 25 years. For context, the total domestic and non-domestic demand in a dry year is approximately 85 MI/d. The company plan states that it will have approximately 25MI/d of leakage in a dry year. However it is important to note that the company is currently reviewing its water resources management plan will publish a draft for consultation in April 2013.

### Conclusion

In conclusion, we believe the company should continue to plan for future supply through its water resources planning and drought planning process. The Kennet resource zone currently has a surplus of water and therefore we have no immediate concerns about the risk to supply. We do however expect the company to use our precious water resources efficiently and sustainably. The Government has stated that it expects a significant downward trend in the demand for water, even in areas of surplus.

### The extent to which the local waste water system is also sufficient for current and projected future demand

The local waste water system includes Reading Sewage Treatment Works and the pipe network that feeds into it. To ensure the system is sufficient for current and future demand both aspects need to be accounted for.

Along with Thames Water we monitor the discharge from Reading STW to ensure it is complying with it’s permit and not causing environmental damage. Additionally an assessment of potential future growth, as dictated by the extant Southeast plan (Policy H1), indicated that there would only be a minor increase to the flow going to the STW (approximately 4% increase

<sup>5</sup> Now known as temporary use bans

<sup>6</sup> Megalitres per day

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in population equivalent being served) and as such should be able to cope with the future demand. The Environment Agency is a statutory consultee within the planning process and through this we work with all relevant parties to ensure that adequate sewerage infrastructure is provided prior to or inline with future development.

There is very limited data on the capability of the sewer network feeding into Reading STW. Although we have responded to incidents of sewer overflows in the Reading area, there has been no indication that these were due to lack of capacity from increased housing numbers. Sewer networks are susceptible to blockages caused by businesses (e.g. restaurants) disposing of fats, oils and grease (FOG) into the sewer network. This may require maintenance by the sewerage undertaker and not necessarily upgrades to the pipes. We liaise with Thames Water to identify priority sites where problems such as overflows could cause significant environmental damage and work with them to resolve them.

### **How the council and partners can help reduce demand and promote water efficiency**

We recommend Reading Borough Council consider incorporating the following two planning policies:

- setting a water efficiency standard for new homes of 105 litres/head/day (l/h/d), equivalent to level 3/4 for water within the Code for Sustainable Homes (CfSH), because there are limited water resources in the local area and high and growing demand for water. This 105 (l/h/d) can be achieved easily with existing technology and at very little extra cost. (Your council may also wish to consider the broader environmental benefits of adopting the whole CfSH Level 3 or 4).
- setting a water efficiency standard for new non-household development, including refurbishments, such as BREEAM (BRE Environmental Assessment Method) 'Excellent' with a maximum number of 'water credits'<sup>7</sup>. Alternatively buildings could meet the 'best practice' level of the AECB (Association for Environment Conscious Building) Water Standards.

Reading Borough Council sits within an area currently assessed as 'seriously' water stressed. This means there is a high population with high water demands and limited water availability – it does not reflect water companies' ability to supply water. Inefficient use of water can also lead to unnecessary carbon emissions. Currently water use accounts for 27 percent of all carbon emissions from our homes. Building a house to 105 litres per person per day will save 79 kilograms of CO<sub>2</sub> and 15 cubic meters of water per year, per house, over and above building regulations (125l/h/d).

With the limited water resources in the local area and a high and growing demand for water combined with the amount of development proposed in the borough, we recommend that water efficiency standards should be higher than building regulation standards. The recently published CLG consultation on Planning Policy Statement (PPS) Planning for a Low Carbon Future in a Changing Climate supports this approach. In particular Policy LCF 5 states that:

'In areas of water stress, and so as to secure development that would otherwise be unacceptable for its proposed location, [climate change] resilience should be provided by setting standards for water usage in new development;'

Policy LCF 9 allows that a requirement can be stipulated locally and solely in relation to the energy/CO<sub>2</sub> emissions standard and/ or water standard in an identified level of the Code.

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<sup>7</sup> It is possible to achieve 'Excellent' standard without incorporating water saving measures. We therefore recommend buildings should achieve the maximum number of water credits in accordance with the requirements of the relevant BREEAM scheme, with the exception of credits awarded for greywater/rainwater systems. These systems should only be installed where cost effective and the system is designed to ensure that energy use and carbon emissions are minimised.

## ENVIRONMENT AGENCY

For example Wokingham have an adopted Construction and Sustainability Supplementary Planning Document which provides a good example of water efficiency being incorporated into planning policy<sup>8</sup>.

In addition to incorporating water efficiency into development of new homes and commercial premises, the Borough should consider partnership working with local water companies to deliver targeted water efficiency campaigns to increase water efficiency in existing housing stock through initiatives such as:

- Retrofitting projects supplying water devices to homes (such as hogs and hippos for toilets and spray tap fittings) as well as
- Road shows in schools educating people and children about water efficiency (such as the project recently carried out by Action for the River Kennet and Thames Water<sup>9</sup>).

This is particularly effective where households are metered and can save money by using less water.

For more information on being water efficiency in the home Waterwise.org.uk can offer further advice.

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<sup>8</sup>

<http://www.wokingham.gov.uk/planningcontrol/planning/planningpolicies/sustainable/sustainabledesignandconstruction/>

<sup>9</sup> <http://www.waterwise.org.uk/pages/community-led-initiative.html>

**Reading Borough Council  
Scrutiny Review – Water Security  
Written Evidence**

**The implications of climate change for water security and water management in Reading**

Professor Nigel Arnell  
Walker Institute for Climate System Research  
University of Reading

**1. Introduction**

This written evidence summarises the implications of climate change for water security and water management in Reading. It focuses on water supply and treatment, together with the risks associated with direct flooding from rainfall. It does not consider the effects of climate change on flooding of property from rivers (Thames, Kennet, Foudry Brook and Loddon). Direct flooding from rainfall is considered because the storm drain and sewerage networks are inter-linked.

**2. Context**

There is now convincing evidence that the earth's climate is changing due to human activities, and will continue to change into the future. The average temperature in Reading in 2001-2010 was 0.9°C higher than the average over 1971-1990 (using data from the Reading University Atmospheric Observatory), and by 2050 temperatures may increase by another 2°C under plausible climate scenarios. However, the increase in temperature has not been consistent, and notable cold spells were experienced in the winters of 2010/11 and 2011/12. This pattern is likely to continue, with a gradual increase in temperature interspersed with occasional cold winters or cool summers.

There has been no detectable trend in rainfall in Reading over the last few decades – in common with many other places – because rainfall varies considerably from year to year. Current projections are that *on average* winters will become slightly wetter in Reading by 2050, and *on average* that summers will become drier. However, as with temperature, this average trend is likely to include years or sequences with dry winters and/or wet summers. There is compelling evidence that the frequency of intense rainfall events will become more common, even during drier conditions.

**3. Implications of climate change for the reliability of water supplies**

By changing the distribution of river flows through the year and the amount of groundwater recharge, climate change has the potential to alter the reliability of water supplies to Reading, in the

absence of interventions to improve reliability. The precise effects on the reliability of supplies of changes in river flows and groundwater recharge depend on how the water supply system is operated and managed by Thames Water, and on precisely how river flows and recharge change. Nevertheless, there is potential for climate change to change the reliability of supplies to consumers in Reading. A challenge for Thames Water is to develop a strategy to address potential changes in reliability, in the face of uncertainty over the magnitude of the change and within the current regulatory environment.

Climate change also has the potential to increase the demands for water, particularly during hot dry spells when garden watering demands are high. These effects on average demand are likely to be small compared with other pressures on demand, such as population growth, changes in commercial demand and changes in the way water is used in the home and in businesses. However, climate change has a greater potential effect on peak water demands, and these have implications for the distribution of potable water.

#### **4. Implications of climate change for reliability of distribution systems**

The water distribution network is designed to cope with currently anticipated peak demands. Climate change has the potential to increase peak demands following hot dry spells, as demands for garden watering increase. This may place increasing pressure on the distribution network. However, this may be offset by changes in garden watering practices – gardeners may move towards more drought-tolerant plants if hot dry spells become more prevalent – but this is currently highly uncertain. Research on consumer behaviour is needed in order to project the potential effects of climate change on peak water demands.

#### **5. Implications of climate change for supply and treatment facilities**

Water supply and treatment facilities are potentially exposed to flood events, which could disrupt the supply of potable water and treatment of effluent. Lower river flows, and higher water temperatures, could also affect the discharge of treated effluent.

#### **6. Implications of climate change for storm rainfall**

An increase in the frequency of intense rainfall events is likely under climate change. When these events occur over built-up areas, they can lead to localised flooding (often contaminated with sewage) as drains overflow. Climate change therefore has the potential to lead to substantial increases in the frequency of such flooding, unless measures are taken to increase the capacity of storm drains.

Councillor Tony Jones,  
Reading Borough Council.  
(email to [simon.a.hill@reading.gov.uk](mailto:simon.a.hill@reading.gov.uk))

Dear Councillor Jones,

## **SCRUTINY REVIEW – WATER SECURITY**

Thank you for the invitation to participate in the review of Water Security and Water Management. The results will also be of relevance to the current review of Reading's Climate Change Strategy for which I am 'theme lead' for the 'Built and Natural Environment' theme which includes water supply issues.

### **Climate Change:**

There is a need to consider the long-term impacts of climate change on water resources and management in the region. For example, climate variability is likely to lead to extreme events in future decades and may impact on flooding. Some areas of Berkshire are already suffering from vulnerability to flooding, for example the severe flooding in South Reading and in Pangbourne in recent years. At the same time, droughts may also become more prevalent during summer months.

The issue of climate change must now be integrated into long-term planning and modelling of water resources in the region, including ensuring water infrastructure is adapted over a long time scale. Adaptive management is needed to adapt to a range of scenarios due to the inherent uncertainty about the future changes, including raising awareness of communities to promote water efficiency. In the face of uncertainty a conservative approach is appropriate.

The Adaptation Sub-Committee of the Committee on Climate Change has this year produced a report <http://www.theccc.org.uk/reports/adaptation/2012-progress-report> "Climate change – is the UK preparing for flooding and water scarcity?" Its summary says:

The Government and water companies should take further steps to increase efficiency in water use, including through water metering and pricing. Increased uptake of meters will be particularly important in locations with current and future risks of supply-demand deficits.

- More efficient use of water is a powerful way to cope with future deficits in water supply.
- On current trends average water consumption could be reduced from 145 litres per person per day to 130 litres or less per person per day by 2035.
- This is readily achievable by uptake of household efficiency measures, wider use of water metering and raising awareness. Reducing average consumption by 15 litres per day goes further than current water company plans and could halve the projected deficit from climate change and population growth

### **Biodiversity:**

Measures to address human requirements must not be allowed to undermine biodiversity of the area so abstraction of surface water and ground water must be limited and groundwater levels must be maintained.

### **Ground Sourced Heat:**

In the future ground-sourced heat may well become important in Reading – drilling down perhaps 100m to draw on the heat available in the underlying aquifer – so maintenance of levels and flows in the aquifer may become significant for energy supply as well as for water supply and biodiversity.

### **Supply: Sources and Storage:**

From work on development in South Reading we understand that there were boreholes on the former Courage site (now Tesco) adjacent to M4 Junction 11. It could be useful to establish if they are still viable, and if so, what capacity they have and if they could be used as a local emergency supply in case of drought.

Thames Water's proposal for a major new reservoir in South Oxfordshire was recently rejected by the Secretary of State. Any such proposals will be very costly and will use a significant area of (presumably)

useful land which could otherwise be used for forestry, agriculture or wildlife. Reducing demand is likely to be more cost-effective and sustainable.

Rain water harvesting is not generally seen as cost-effective but grey water re-use may be applicable in some instances. An EA report <http://cdn.environment-agency.gov.uk/geho0511btwc-e-e.pdf> says “If used for toilet flushing, a well-designed and fully-functional greywater system could potentially save a third of the water used in the home.” This technology should be investigated and – if found to be useful – measures should be taken to get it adopted.

#### **Utilities and Regulators:**

Most expertise on supplies and resources presumably resides with Thames Water and the Environment Agency so it will be important to involve them in the Scrutiny Review.

The EA publishes Regional Water Resources Strategies, local Catchment Abstraction Management Strategies, and Water Level Management Plans for particularly sensitive areas. In 1999 actions were in progress to address low flows in the Pang and the impact of the Pangbourne Abstraction. Its 2008 paper “Water Resources in England and Wales - current state and future pressures” shows Reading in an area of ‘Serious Water Stress’ and says that “When we take population density into account (Figure 4a), we actually have less water per person in South East England than many hotter, drier countries such as Morocco and Egypt.”

#### **Key Action Areas:**

We must aim to have adequate water supplies to meet domestic, industrial and agricultural demand (including watering gardens and allotments) whilst maintaining and improving biodiversity. If lifestyles and output are not to be disrupted by drought there must be a focus on reducing demand in this area to a sustainable level by reducing water consumption per person, managing the growth of the population, and reducing water use by industry.

The EA target of an average of 130 litres per person per day is not very ambitious but it does cover both new build and existing properties. For new build the Environment Agency report <http://www.environment-agency.gov.uk/static/documents/Utility/SCHO0805BJNS-e-e.pdf> “Sustainable Homes – the Financial and Environmental Benefits” says that for new homes 92 litres is ‘achievable’ (comparable to EcoHomes) at ‘insignificant’ cost and that 71-84 litres is an aspirational target at cost in the range £1,000 to £2,000.

Planning and Development Control could target lower consumption in new-build homes – I believe their current target is 125 litres per person per day.

Measures are needed to achieve widespread take-up of water metering and retrofit of water saving measures in existing homes – an education program is called for, and perhaps some equivalent of ‘green deal’ funding or funding by the utilities.

‘Water neutral’ development has been suggested – where a new development funds improvements to existing properties to offset the consumption of the new development. However this will only stabilise consumption not reduce it overall.

Businesses will also benefit from technical help and financial incentives to cut use. Thames Water have the power to inspect premises but may not have the resources to be as active in this area as is necessary to maximise water saving. It would be interesting to locate and target particularly water-intensive businesses in Reading.

A lower population density would not only reduce demand for water, but also for food, energy, forestry products and recreational space – sustainable living requires that we take account of environmental capacity. This feeds in to wider strategic planning issues for which there is no longer a national forum. The Council could press for a return to national and regional strategic planning to allow such issues to be considered.

I hope this note is useful and I look forward to the review meeting.

Yours sincerely,

John Booth

Reading Friends of the Earth.

(This version with corrected hyperlinks – 13<sup>th</sup> November 2012)

## PETER BRETT ASSOCIATES

I have reviewed the letter you sent to me on 26 October 2012 and I respond on behalf of Peter Brett Associates LLP to the three points you are investigating as part of the Scrutiny Review. PBA are a medium sized engineering and land development consultancy company with our Head Office located in Reading. As well as an employee of PBA, I am also a board member of the Reading Climate Change Partnership.

1) the extent to which the local and regional infrastructure for the supply and storage of potable water is sufficient for current and projected future demand.

The PBA head office has experienced no issues in relation to the supply of potable for its office, and although we have a business model for growth, the company does not expect to increase demand significantly in the future as the nature of the business (office based) will be the same.

In relation to potable water infrastructure, PBA's experience in the delivery of new land development projects (e.g. new housing / commercial developments) in the local area is that new infrastructure and connections for potable water are a statutory provision for which specific infrastructure is designed for each development on a project by project basis. Consideration of the whole local potable water supply and storage system is outside of the scope of our projects.

2) the extent to which the local waste water system is also sufficient for current and projected future demand

The PBA head office has experienced no issues in relation to the capacity of the local waste water system for its operations, and although we have a business model for growth, the company does not expect to increase demand significantly in the future as the nature of the business (office based) will be the same.

In relation to possible future demand, PBA's experience in the delivery of new land development projects (e.g. new housing / commercial developments) in the local area is that new infrastructure and connections for waste water are a statutory provision for each development. Consideration of the whole local waste water system is outside of the scope of our projects.

3) how the Council and partners can help reduce demand and promote water efficiency

PBA monitors its environmental impacts and resource use on an annual basis and publishes a Corporate Responsibility Report. PBA have installed a number of water efficiency measures within its building (which is leased) including low

## PETER BRETT ASSOCIATES

flow taps and dual flush toilets. As an office-based organisation, water consumption is not a significant part of the environmental impact from our operations. From a company perspective, any measures (including information) that make water efficiency measures easier to provide or install within a corporate / office setting are welcomed.

PBA is experienced in the delivery of land development projects and in this context we would promote the benefits of schemes such as the Code for Sustainable Homes in helping to reduce future demand and promote water efficiency in relation to new developments. However, such schemes on their own are certainly not enough to reduce demand and promote water efficiency, as they only concentrate on new development. We would also challenge whether such schemes can deliver benefits for all developments and would suggest that in relation to reduction of water demand that you look at water recycling, green water use and lower demand apparatus. On this last point however, some new developments install low water use equipment to meet for example CfSH requirements, but we are concerned that such equipment is replaced by owner / occupiers after initial purchase thereby making such measures meaningless. In our opinion, metering is probably the main control on water use, in combination with monitoring and the management of leaks.

## KYOCERA MITA

As a purely office-based business, our water use is quite low but we have taken the following measures:

- Optimising the auto flush settings in our urinals so they only operate during working hours and then at longer intervals
- Fitting cistern “bricks” to minimise water used during flushing
- Using water boilers that dispense on demand rather than kettles (although this is an energy saving measure, we found people tended to rinse out kettles before refilling them, so that wasted water, too!). These are also timed to operate only during working hours.
- The dishwasher provided for use by our cleaners was selected on the basis of water efficiency across all the settings; we felt this was preferable to one that had a single very efficient programme as we have limited control over which setting our cleaners choose to use!

As tenants we don't have the opportunity to implement measures such as grey water collection and re-use, and we aren't responsible for maintaining green spaces around our building so we can't really influence water use outside the building.

We'd be receptive to other suggestions as to how we can reduce our water consumption!

Thames Water since the 2010 public inquiry [into a proposed reservoir in Oxfordshire] has investigated a Severn reservoir at Longdon March together with water transfer. Combined the cost of this would be less than an Abingdon reservoir. The seasonal recharge water from the river Severn would be far more secure than an isolated reservoir in Oxfordshire. Longdon Marsh and Severn transfer is a robust and secure water resource to augment the river Thames.

The 2004/5 Thames Water proposal was for a 150 million cubic metre reservoir, by 2010 when Thames Water had to present themselves before two Defra inspectors with their Water Resources Plan for 2009, a 150 million cubic metre reservoir with 300ML/d deployable output had shrunk by one third to 100 Million Cubic Metres, upon public examination Defra inspectors could not be convinced that TW could prove a need for about 67ML/d in 25 years time nor was there a clear case for even a 50 Million Cubic Metre reservoir. A desalination plant able to provide a deployable 150ML/d had already been built in London, it was commissioned before the Olympic games. A deployable output of 150ML/d is water at the heart of London without needing to construct an equivalent 75 Million Cubic Metre reservoir in Oxfordshire.

Had the Oxfordshire reservoir project gone ahead without the public inquiry, then £1bn of debt would have been created for Thames Water customers, every water bill in Reading and over the whole Thames Water region would have significantly increased by now.

It will be populations in Reading, Oxford and Swindon who must pay for mixing surface water into foul sewers in the London area. London does not appear to have been following a water-efficient sustainable city development plan, others are now expected to pay for this.

The operation of building regulations in Greater London has allowed developers to drain urban roof water into sewers, Thames Water has been content to bill every greater London household £7.50 pa for this to happen. Then when the water treatment works started to flood and overflow into the Tidal Thames, every Thames Water customer will be forced to pay for a massive sewage storage reservoir to be created under the river Thames.

After the rain storm, a mixture of rain water and sewage will be pumped up from the underground reservoir to be treated and discharged into the sea.

Residents of Reading will be paying for this method of rain water surface water drainage. This project will add to the cost of water bills for all Thames Water customers. Towns like Swindon, Oxford and Reading should learn how mixing rain water into sewers is a payment to Thames Water but also a massive eventual bill to domestic water customers. Expenses like this cause domestic inflation, putting water customers into debt which profits only bankers. Sustainable urban drainage schemes without high pumping and water treatment cost, where water might be harvested for domestic use would be the sustainable planning criteria.

Councillors might note that Didcot A power station will close in March 2013, currently this coal fired power station consumes 20Ml/d of Thames river Water, after March there will be no water needed for Didcot A power station, water resource security in the river Thames will improve by 20Ml/d.

The Environment Agency should be able to detect this from their river Thames computer model called "WARMS". It is not clear how much progress has been made with the project to write a new and more accurate computer model of the river Thames. A more accurate calibrated river flow model would assist seasonal recharging of existing reservoirs.

Since water privatisation, it becomes a revelation if Thames Water are asked to separate out how much of the average water bill pays for borrowing capital for projects, against the cost of water treatment and supply. A histogram of expenditure on water leakage repair, compared to the effects of water pipe replacement might interest councillors. One expenditure is short term without improving security of supply, when pipe replacement assures security of supply. Has Ofwat been directing water customer expenditure towards security of supply?

Recent press reports likely to interest Council Committee members:  
<http://www.guardian.co.uk/business/2012/nov/10/utilities-water-bills>  
<http://www.guardian.co.uk/commentisfree/2012/nov/11/will-hutton-thames-water-private-equity-plaything>

Submission from Mr W (member of GARD (Group Against Reservoir Development) and Oxford University Water Security Network)