SUMMARY OVERVIEW

Thames Water is the UK's largest water and wastewater services company. We serve over 13.5 million customers in London and the Thames Valley, supplying an average of 2,600 million litres of drinking water per day and treating around 2,800 million litres of sewage.

We have a legal duty to provide a secure supply of safe and clean water to our customers and every five years we are required to produce a Water Resources Management Plan (WRMP), which sets out how demand for water is balanced against the available supply over the next 25 years. Water companies are also required to undertake a public consultation on their draft Plan. This is a new statutory requirement introduced in 2007.

In May 2008, we published our draft WRMP covering the 25-year period from 2010 to 2035. The public consultation began on 7 May 2008 and ran for a 16-week period to 27 August 2008. We have produced a Statement of Response (SoR) to comply with Regulation 4 of the Water Resources Management Plan Regulations 2007. The statement identifies and explains:

- the consideration we have given to the representations received as part of the public consultation on the draft WRMP.
- the changes made to the draft WRMP as a result of the consideration of the representations and the reasons for the changes.
- where we have not made any changes to the draft WRMP as a result of Thames Water consideration of the representations, why no change has been made.

The statement is available on our website, at www.thameswater.co.uk

This document, the Revised Draft Water Resources Management Plan (rdWRMP), formally re-states the draft plan, incorporating the changes as set out in the Statement of Response. Additionally, feedback received from our economic regulator, the Water Services Regulatory Authority (Ofwat), in the lead up to the submission of our Final Business Plan (FBP) in April 2009 has also introduced minor revisions to ensure consistency in both the FBP and the rdWRMP.

As such the rdWRMP consolidates information from the draft WRMP, SoR and FBP to produce a stand-alone document, which need not be read in conjunction with any other document.

This Summary Overview (Volume 1) is the technical summary of our rdWRMP for the period 2010 to 2035. To fully understand our Plan it should be read in conjunction with the following reports:

Volume 2 – Main Report
Volume 3 – Appendices
Volume 4 – WRP Tables
Volume 5 – Assessment of Alternative Schemes
Volume 6 – SEA Environmental Report and Addendum

For ease of understanding and given that there are sections of the report that are essentially unchanged from the draft WRMP, at the start of each section in Volume 2 we have added boxed text containing a summary of the main changes since the draft WRMP. Summarised versions of these boxes are also provided in the Summary Overview. References to other volumes of the rdWRMP are provided using this symbol ☛.

This Summary Overview is structured as follows:

- Introduction and background information
- Water resources programme, 2005 to 2010
- Current and future demand for water
- Current and future water supply
- Allowing for risk and uncertainty
- Baseline supply demand balance
- Appraisal of supply demand options
- Programme appraisal
- Preferred supply demand investment programmes
- Sensitivity testing
- Summary of the main elements of the preferred programme

1 Introduction and Background Information

Volume 2, Section 1 has been updated to include:

- How the rdWRMP relates to previous (and future) submissions.
- An overview of the public consultation on the draft WRMP.

Overview of a Water Resources Management Plan (WRMP)

Thames Water, as a statutory water undertaker, has a duty to maintain the security of water supply. Every five years we are required to produce a Water Resources Management Plan (WRMP), which set outs how we plan to provide water to meet customers' needs while protecting the environment over a 25-year period. The WRMP follows the Water Resources Planning Guideline (WRPG) set down by the Environment Agency (EA)[1]. The main steps are shown in Figure 1.

☛ *Volume 2, Section 1.2*

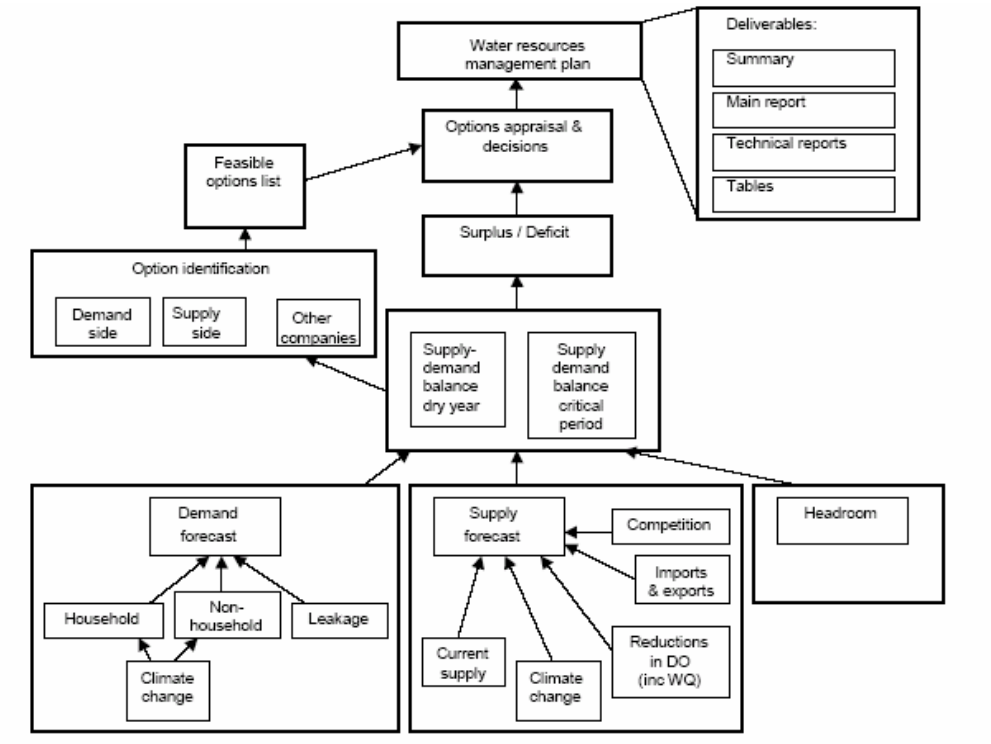


Figure 1: Components of a WRMP (EA WRPG, 2007)

[1] EA, Water Resources Planning Guideline, April 2007

Understanding the expectations and preferences of our stakeholders is important in developing our plans. In preparing the draft WRMP, we sought the views of stakeholders and regulatory bodies through detailed research, customer surveys, regular meetings, and public consultation on *Taking Care of Water*, our Strategic Direction Statement, which set out the company's strategic direction from 2010 to 2035.

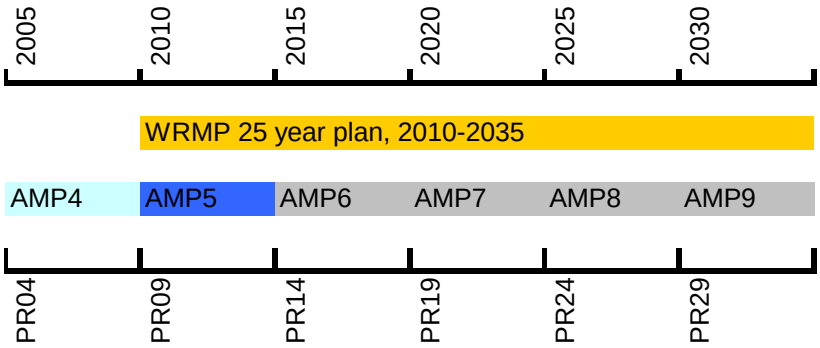
The key areas of interest with respect to water resources were the need to maintain security of water supply, wide support for continued investment to achieve further reductions in leakage and support for greater efforts to manage demand through the promotion of water efficiency and metering. There was also a general acceptance of the need for new resources if all existing options have been fully utilised. We took these comments into account in developing the draft WRMP.

☛ *Volume 2, Section 1.3*

Our draft WRMP was submitted to the Secretary of State for the Environment (Defra), who worked closely with the Environment Agency (EA) and Water Services Regulation Authority (Ofwat) to review our submission.

The EA has a statutory duty for long-term water resource planning and is a statutory consultee in the development of WRMPs. The EA reviewed the draft WRMP and made representations to the Secretary of State.

The WRMP also forms the supply demand component of our Business Plan (BP). The BP covers a 5-year period. The BP is submitted to, and reviewed by Ofwat to set price limits for the next 5 years. This process is known as the Price Review. The next Price Review is PR09 and covers the period 2010/11 to 2014/15.



WRMP provides the supply demand component of the Strategic Business Plan (SBP)
The SBP is submitted to Ofwat in 2009 to inform the 5 yearly Price Review for 2010-2015 (PR09)
When PR09 is agreed, the 5 year funded programme is called Asset Management Plan 5 (AMP5)

Figure 2: Illustration of the Inter-Relationship Between the Draft WRMP, the BP and the Price Review

In May 2008 we published our dWRMP and began a 16-week consultation, our Statement of Response (SoR) provided our response to issues raised in the consultation. This document, the revised dWRMP, consolidates the dWRMP, SoR and other information from Ofwat and our FBP in to a single stand-alone document.

Introduction to Thames Water's Supply Area

Our water supply area covers around 8,000 square km. The area is divided into six independent water resource zones (WRZs) as shown in Figure 3. A WRZ is defined as an area within which all water resources can be shared and therefore customers experience the same level of service. Water resources are planned at a WRZ level.

The largest WRZ (by population) in Thames Water's area is London, which covers the Greater London area. The other five WRZs, SWOX (Swindon, North and South Oxfordshire), Kennet Valley, Henley, SWA (Slough, Wycombe and Aylesbury), and Guildford are collectively called the Thames Valley WRZs.

☛ *Volume 2, Section 1.4*

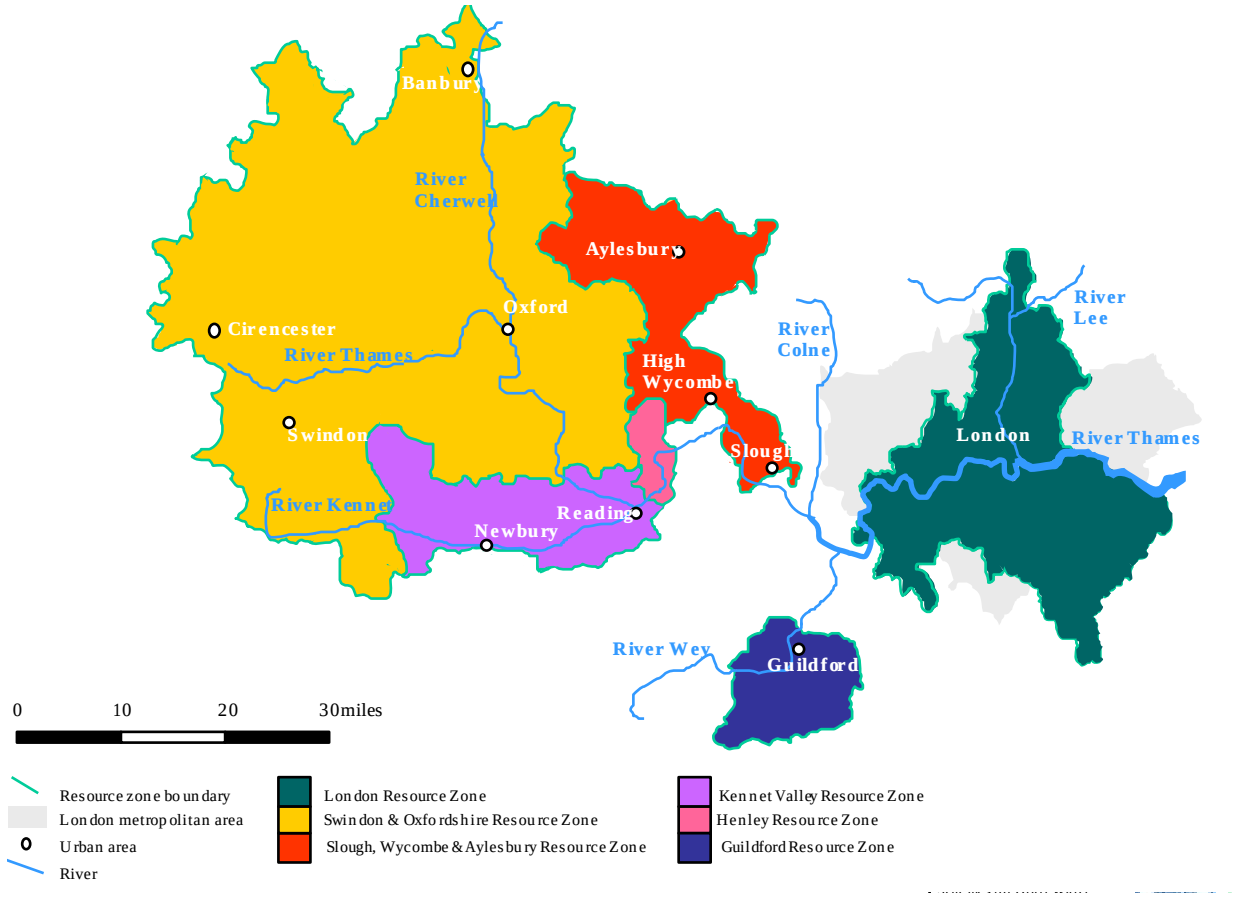


Figure 3: Water Resource Zones in the Thames Water Supply Area

Levels of Service

In planning future water resources we work to agreed levels of service for our customers. The levels of service state the frequency with which we can impose different types of water use restrictions during periods of water shortage and are agreed with Ofwat and the EA. Figure 4 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 situations, this can include restricting customers' water use.

Level	Action	**Frequency** (drought severity)
1	Media campaigns, additional water efficiency campaign, enhanced activity and restrictions to reduce risk to water supply	One in five years
2	Enhanced media campaign, customer choice/voluntary constraint, sprinkler ban	One in 10 years
3	Hosepipe ban, non-essential use ban, drought order	One in 20 years
4	Severe water rationing	Never

Figure 4: Levels of Service

We have conducted customer 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.

Ofwat assesses whether water companies are meeting their levels of service on the basis of their supply demand balances for each WRZ. These are aggregated into a comparative indicator known as the Security of Supply Index or SoSI. A SoSI score of 100 means that all the WRZs are either in balance in terms of supply and demand or have a surplus. A score less than 100 indicates a supply demand deficit and an increased risk that companies will not be able to meet their agreed levels of service for customers.

☛ *Volume 2, Section 1.5*

Lower Thames Operating Agreement (LTOA)

London's principal source of water is the Lower River Thames upstream of Teddington Weir. The Lower Thames Operating Agreement (LTOA) in combination with our abstraction licences help to determine how much water can be abstracted from the Lower Thames. Historically, the LTOA has informed the introduction of water use restrictions in London during a drought. A similar set of rules also trigger restrictions for the SWOX WRZ.

The drought of 2005 and 2006 tested the effectiveness of the LTOA as a tool to manage the drought. During 2006, the EA formally requested a review of the Agreement. The review will impact both on the WRMP and the Company's Drought Management Plan and there are a number of significant issues, the two principal ones being the ecological impact on the water environment of the Lower Thames abstractions and the correct application of the most up-to-date assumptions on demand savings during drought periods.

To address the ecological impact of abstraction, a major investigation on the flows and ecology of the Lower River Thames freshwater reaches and the Upper Thames estuary is proposed for AMP5. The outputs from this study will be used to inform the review of the LTOA in readiness for the start of AMP6 planning in 2012/13.

The 2005/2006 drought and the measures introduced therein provided the Company with the opportunity to review and revise the original assumptions on the savings that can be achieved during droughts. The level of demand during a drought influences the rate at which water in storage is used and therefore the amount available for the duration of the drought (deployable output). Because the updated savings are about 30% of the original savings, the true water resource availability in terms of deployable output values for both London and SWOX WRZs is significantly lower than previously assumed. This has revealed an ongoing supply demand deficit in these zones and therefore a risk that levels of service will not be met, represented by a reduction in the company Security of Supply Index. The LTOA savings assumption therefore has important implications for the size of the predicted supply demand deficits in these zones and the amount of additional investment on demand management and new resources required.

☛ *Volume 2, Section 1.6*

2 Water Resources Programme, 2005 to 2010

Volume 2, Section 2 has been updated to include:

- Actual outputs from 2007/08, which has replaced 2006/07 as the base year.
- New AMP4 final supply demand balance forecasts, for each WRZ.

Our current programme of supply demand activity for the 5-year period from 2005/06 to 2009/10 (called AMP4) was agreed with Ofwat as part of the Price Review process undertaken in 2004 (PR04). There have been modifications to the AMP4 programme in response to developments such as the "Section 19" undertaking. The Section 19 (s19) undertaking is a legal agreement with Ofwat in response to our failure to achieve our leakage targets in 2005/06. Key aspects of the AMP4 programme are summarised below.

☛ *Volume 2, Section 2*

Leakage Reduction

Leakage reduction remains our highest priority. The leakage control programme has three strands: Victorian Mains Replacement (VMR) in London; Active Leakage Control (ALC) which includes the location and repair of leaks, pressure management and zonal reconfiguration; and customer side leakage (CSL) reduction. Our current programme will reduce leakage to 685Ml/d (million litres per day) by 2010 and replace 2,041km (around 12%) of water mains in London.

We have assumed an additional 300km of VMR in London in 2009/10. This is because it is required to restore security of supply in London as quickly as possible and it will be more cost effective for customers if we maintain VMR activity at the current level rather than reducing in 2009/10 only to increase activity again in AMP5.

☛ *Volume 2, Section 2.2.1*

Metering

There are two elements to our AMP4 metering programme, meter optants, customers who request a meter, and selective metering, installation of a meter when a property changes occupancy.

- The AMP4 target is 62,770 meter optants by 2010. We had already exceeded this target in the first three years of AMP4, April 2005 – March 2008. This is believed to be due to increased customer awareness created by the prolonged drought of 2005/06, local and national press coverage of metering and increasing customer bills.
- The AMP4 target for selective meter installation on change of occupancy is 49,282. Initially two change of occupancy metering trial areas (Chigwell and Swindon) were selected, however the geographical area was expanded throughout 2006/07 to secure the delivery of the target. The areas now included in the trial are Oxfordshire, Twickenham, Kingston, Croydon, Dartford, Bromley, Tonbridge and the VMR areas.

Despite expanding the areas for the trial, we are experiencing a slow down in activity as a result of the economic downturn and reduction in the number of property moves.

Customer access and complex supplies remain an ongoing problem in relation to metering, particularly in flats, with successful installation (conversion) rates remaining lower than expected at 40% for these properties. As a result, we do not consider the change of occupier approach to be a cost effective method of installing meters when compared with 'street by street' compulsory metering.

☛ *Volume 2, Section 2.2.2*

Water Efficiency

In response to the ongoing pressures on water resources, commitments given in discussions relating to the s19 undertaking and higher expectations of our regulators and the wider stakeholder community, the baseline water efficiency programme has been strengthened from that agreed at the beginning of AMP4. The enhanced programme targets both domestic and commercial customers through water audits and self audit questionnaires, promotion of water efficient devices and education projects.

☛ *Volume 2, Section 2.2.3*

Water Resources Development

New water resource schemes are being developed in London, SWOX and Kennet Valley WRZs. By the end of AMP4, we will have added to London's deployable output (DO) through the delivery of small-scale groundwater schemes and a desalination plant at Beckton. In SWOX, an increase in DO is provided by a combination of water treatment works upgrades and network improvements. The Kennet Valley WRZ will also benefit from an upgrade to the water treatment works to enable more water to be treated.

☛ *Volume 2, Section 2.3*

The study to investigate indirect effluent re-use in London, is ongoing. Work has been undertaken in to the feasibility of the Upper Thames Reservoir (UTR).

☛ Volume 2, Section 2.4

3 Current and Future Demand For Water

Volume 2, Section 3 has been updated to include:

- a comprehensive review and update of the demand forecasts including property and population forecasts, the impact of the economic downturn, the micro-components of demand and 'bounceback' from drought of 2006.
- as a result of the updates above, there has been an overall reduction in demand compared to the draft WRMP throughout the planning period.

☛ *Volume 2, Section 3*

To plan water resources effectively in the future we need to forecast the amount of water that we will need to distribute. This is called "demand". Demand describes the amount of water entering the 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.

In our supply area, in 2007/08 (the base year), household consumption accounted for 49% of demand, non-household consumption 21% and unbilled and operational use 2%. Leakage accounted for 28% of demand; split into 20% distribution losses and 8% customer supply pipe leakage.

We follow the industry best practice demand forecasting methodology. Three types of demand forecast are produced:

- Normal year annual average day (NYAA) – this means the average daily demand experienced in a normal year;
- Dry year annual average day (DYAA) – this means the average daily demand experienced in a dry year;
- Critical period: Average day peak week (ADPW) – this means the average daily demand experienced in a peak week of a dry year.

Peak week demand forecasts are only required where they are understood to be a driver for investment (i.e. the conditions under which levels of service cannot be met without additional investment).

A peak week forecast is not produced for London as the large surface water storage capacity in the zone ensures that the peak demand can be met. In London, the focus is on the dry year annual average day demand forecast. In the Thames Valley WRZs, the average day peak week supply demand balance is the principal investment driver.

A 'Baseline' supply demand balance is produced for each demand forecast scenario. This shows if a WRZ is forecast to have a supply demand deficit under either DYAA or ADPW conditions or both.

A 'Preferred programme' supply demand balance shows the supply and demand position when we deliver the proposed programme of demand management and resource development to eliminate the deficit.

How Will Demand Change in the Future?

Demographics

The forecasts of future population and properties are based on underlying source data from Government census data (the latest being the 2001 Census), Regional Spatial Strategies (RSS), past trends and local authorities' forecasts of future population and household numbers. The rdWRMP takes account of the latest available information. We base our forecasts on a combination of these sources together with an expert external consultant's view of the most likely scenarios for population growth.

Assessment of population growth for the total company supply area indicates that there will be a rise from 8.5 million in 2007/08 to 10.2 million by 2034/35. This increase is made up of 1.3 million in the London WRZ and 0.4 million in the remaining five zones (Thames Valley). We have added an additional allowance of 282,000 for the clandestine ('uncounted') population and 110,000 short-term migrant population in our forecasts as we believe the official statistics under-estimate these sub-groups.

Approximately 94% of the population of the London WRZ is within Greater London, the remainder being divided between Essex and Hertfordshire in the East of England region and Kent and Surrey in the South East region. Projections are therefore dominated by assumptions about growth in Greater London, though a high growth rate is also expected in the Dartford area, which forms part of Kent Thames Gateway. These population rises will be accompanied by increases in new households and we have estimated that there will be about 26,700[2] new households per year in London.

Our rdWRMP household and population forecasts include allowances for the economic downturn based on a study[3] commissioned by Thames Water from economic and demographic experts Cambridge Econometrics.

☛ *Volume 2, Section 3.2.1*

Household Consumption

Water use per person (or per capita consumption – PCC) is affected by several factors, the principal ones being: household occupancy; water use of appliances, fixtures and fittings within the property; householders' water use behaviour; garden use and whether the property is metered.

In line with industry best practice, we have assessed household demand and PCC at the 'microcomponent' level, examining the ownership, frequency of use and volume per use of a range of water-using appliances. Figure 5 shows the components of household water use as a percentage of the total consumption.

[2] Note that this is an average for the planning period. The figure is lower due to the impact of the economic downturn in AMP5-6 and higher in AMP7-9.
[3] *Cambridge Econometrics - Assessment of Economic Downturn on Planned Properties and Population Growth* – A Report for Thames Water Utilities Ltd, December 2008

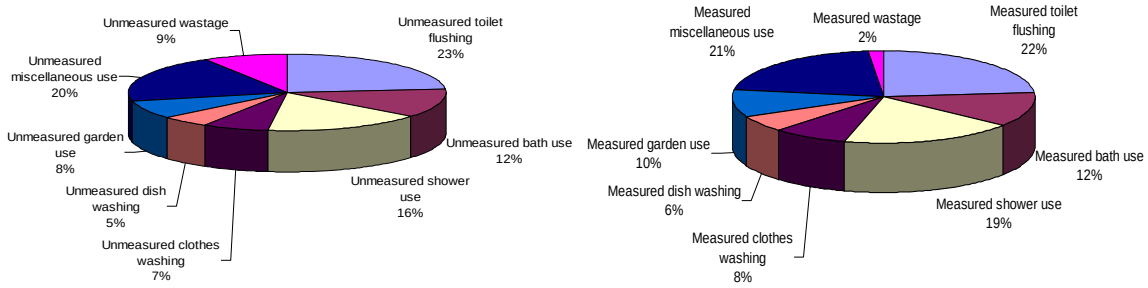


Figure 5: Typical Micro-Component Breakdown of Measured and Unmeasured Household PCC – 2007/08

Over the planning period to 2035 underlying PCC (before demand management) is forecasted to rise from the current position of 157 l/h/d. Reductions in the short term in reaction to natural replacement of inefficient goods with newer more efficient appliances will be counterbalanced in the medium to long term due to increased ownership of power showers.

☛ *Volume 2, Section 3.2.2*

Water usage in new households has been the subject of widespread national debate in recent years and Government has outlined policies and measures that will reduce domestic consumption in new properties through the introduction of new building regulations for fixtures and fittings. We have assumed that usage in new properties will reduce to the Government's target of 125 l/h/d by 2015. This will allow for a period of bedding-in and confirmation that the standards are being achieved. We believe this is a challenging target, particularly with reducing occupancy, but we support the Government's action in this area.

In the Government's water strategy for England entitled *'Future Water'*, Defra also set out their aspirations for water usage in existing households. It is stated that as a result of demand management measures, PCC in existing properties could be reduced to an average of 130 l/h/d by 2030, with the hope of further reduction to 120 l/h/d with the impact of future innovation and technology.

We have made a detailed assessment, in line with industry best practice methodologies, of future demand based on the individual components of water use and consider that reaching 130 l/h/d in existing properties within the Thames Water supply area is unlikely. Our assessment includes an allowance for the impact of reducing household size and increased garden watering due to the impact of climate change on demand.

When considering this target it is also important to note that natural variability in PCC across the country results in higher PCCs in the South East of England. Over the last 6 years, Thames Water has reported PCCs on average 12 l/h/d higher than the national average for water and sewerage companies.

We strongly support the aspiration to reduce individual water use through demand management and our plans include implementation of all of the measures referred to in the strategy, with significant programmes of metering, exploration of different tariff options and water efficiency.

However, given our detailed predictions of the amount of water which our customers will need in the future, and the fact that the required change in the culture of water use is to the greater extent outside of the control of the company, we believe that planning to a level of 130 l/h/d would be a high risk strategy which could jeopardise future security of supplies to our customers.

We have therefore planned on the basis of our own detailed water use predictions. The rdWRMP demand forecast uses a prediction of a reduction in average household PCC from 157 l/h/d (2007/08) to 135 l/h/d (2034/35), when accounting for preferred plan demand management activities, which we believe is in line the aspirational target given a reasonable adjustment for demonstrably higher PCC in our operational region.

☛ *Volume 2, Section 9.1*

We have also updated our non-household demand forecasts based on an assessment of the historical relationship between demand and factors such as industrial output and employment. Our non-household demand forecasts include and allowance for the impact of the economic downturn. Based on consultations with some of our largest commercial customers we have included a further 5% reduction in demand maintained over the planning period.

☛ *Volume 2, Section 3.2.3*

4 Current and Future Water Supply

Volume 2, Section 4 has been updated to include:

- further information on the impact on deployable output of the review of demand savings following the 2005-06 drought.
- revised outage risk figures, incorporating a further years data.
- further information on the Sustainability Reductions required in AMP5 and beyond.

☛ *Volume 2, Section 4*

To understand the amount of water that is available to use for water supply, we use a measure called Water Available For Use (WAFU). WAFU is calculated according to the following relationship:

WAFU = Deployable Output (DO) – Sustainability Reductions – Network Constraints – Outage + Bulk Supply imports – Bulk Supply exports

Where:-

DO is the measure of a WRZ's supply capability and is assessed on the basis of the water resources that will be available to meet demand to our specified levels of service during prolonged dry periods.

☛ *Volume 2, Section 4.1.1*

Sustainability reductions are reductions in DO caused by the full or partial revocation of abstraction licences by the EA. Many abstraction licences have been in place for many years and in accordance with new environmental requirements have been reviewed to ensure protection of the environment. Further information on the investigations undertaken in this period (2005-2010) is described in the Volume 2, Section 2.5.

In AMP5 we have included reductions required at three sites in the SWOX and Kennet Valley WRZs. We are not allowed to include further anticipated reductions in our plans until they are confirmed by the EA. This represents a significant risk for our long term plans.

☛ *Volume 2, Section 4.2*

Network constraints arise when the configuration of the distribution network pipes does not allow the total treated water output from a given source to be fully utilised in the WRZ.

☛ *Volume 2, Section 4.1.2*

Outage is a temporary loss of supply capability caused by a variety of planned and unplanned events such as maintenance of reservoirs, pollution to raw water quality and pump failure. It is estimated on the basis of our historical records. We have updated our

outage figures to include an extra years data, with the impact of increasing the outage allowance.

☛ *Volume 2, Section 4.1.3*

Bulk supplies are the transfer of untreated or treated water into or out of a WRZ, either within a Company's area or between companies.

☛ *Volume 2, Section 4.1.4*

5 Allowing for Risk and Uncertainty

Volume 2, Section 5 has been updated to include:

- outputs from the restructured and consolidated demand uncertainty model.
- new demand components, PCC of new properties and demand 'bounceback'.
- removal of time limited licences from analysis.

☛ *Volume 2, Section 5*

Almost all the components of supply and demand together with their associated planning assumptions are subject to uncertainty. Therefore, how uncertainty is allowed for is of fundamental importance in supply demand planning.

The approach taken follows the latest water industry methodology, which uses a margin of safety termed 'Target Headroom' (TH) as a buffer between supply and demand. TH is added to demand and the need for new additional water management options is triggered when TH and demand exceed supply capability.

There is a strict industry standard procedure for calculating TH made up of all the key components of supply and demand.

On the supply side, the main components are:

- vulnerable surface water and groundwater abstraction licences
- bulk imports
- gradual pollution of sources causing a reduction in abstraction
- accuracy of supply side data
- uncertainty of impact of climate change on source yields
- uncertainty of output from new resources.

In the draft WRMP we also included an allowance for the possible revocation of vulnerable time limited licences. This has been removed for the rdWRMP, resulting in a minor reduction in TH.

On the demand side, the main components are:

- population
- uncertainty on measured and unmeasured household PCC
- uncertainty in measured and unmeasured non-household use
- uncertain output from demand management measures (excludes leakage)
- uncertainty over peaking factors
- uncertainty of impact of climate change.
- uncertainty in 'bounceback' of demand following drought events.

The uncertainty associated with leakage control has been separately evaluated. The most significant factor driving leakage uncertainty is the level of active leakage recurrence of the network. This is driven by weather in the short-term and can only be addressed by the Company in the longer-term through further mains replacement associated with water infrastructure maintenance.

☛ *Volume 2, Section 7.3.2.6*

The TH methodology requires that a risk level be chosen over the planning period. We have adopted what we consider to be a pragmatic risk profile starting with 5% in AMP4, reflecting the need for low risk in the short-term, but stepping up by 5% in each subsequent 5-year AMP period, to reach 30% in AMP9. We believe this is a sensible approach, given the increasing uncertainty over time and the number of opportunities afforded by the planning cycle to review the risk, and is in line with other companies' assumptions at PR04.

Climate Change

By far the biggest uncertainty factor is the impact of climate change, which affects both supply and demand. For example, reduced or extreme variation in annual rainfall rates may mean that the yields from river or groundwater sources could be reduced and household water use could increase through increased garden watering and increased frequency of bathing and showering.

We have used the latest guidance and methodologies to calculate the impact of climate change. To calculate the supply-side impacts, Thames Water has adopted the UKWIR06 methodology as recommended in the EA's WRPG. Factors from six global climate models have been used to produce rainfall and evaporation data to feed into our Water Resources Management System (WARMS). In addition the impacts of climate change on groundwater sources have been reviewed following the new methodology.

Our best estimates of climate change on demand are based on the CC:DeW study which indicates an increase of around ~1% of PCC, with an uncertainty profile added to headroom.

The UKCP09 climate change scenarios were published on 18th June 2009, analysis is underway to understand the impact of these on our plan, but we do not anticipate these scenarios to be significantly different from those previously published.

☛ *Volume 2, Section 5.1.1*

6 Baseline Supply Demand Balance

Volume 2, Section 6 has been updated to include:

- the impact of changes in data as set out in the previous sections.
- new supply demand balance data resulting from those changes. Overall, forecast deficits in London & SWOX WRZ are reduced. Surplus remains in all other zones.

☛ *Volume 2, Section 6*

To understand if we have sufficient water to meet customers' needs over the planning period, we compare water that is available for use (WAFU) against demand and TH. This assessment produces the baseline supply demand balance for each WRZ and shows whether there is sufficient water to meet customers' needs or if there is a gap or deficit.

The baseline supply demand balance assumes that there will be no activity beyond 2009/10 other than that required to maintain leakage or required by law. In practice, this means a continuation of optant metering, water efficiency activity and planned maintenance (capital maintenance) of our mains and active leakage control to maintain leakage at 2009/10 levels.

☛ *Volume 2, Section 3.3*

Table 1 shows that both London and SWOX WRZs are predicted to have supply demand deficits. The London WRZ falls into deficit in 2012/13, with the supply demand balance deteriorating from a surplus of 1% in 2009/10 to a deficit of 15% by the end of the planning period. The predicted deficit for the SWOX WRZ increases from 5% to 14% of demand plus TH.

The escalating deficits are driven by growth in demand and the uncertainty allowances made, especially for climate change. An additional factor is the reduction in deployable output resulting from the reduced demand savings demonstrated during the management of the 2005/06 drought and associated with the LTOA Review.

In contrast, Slough/Wycombe/Aylesbury, Kennet Valley, Guildford and Henley WRZs all maintain a surplus over the planning period. In AMP4 and AMP5 these zones show a healthy surplus of between 11% and 30%, which gradually declines as demand grows and the planning uncertainties increase.

Table 1: Baseline Supply Demand Balance in all WRZs 2009/10 – 2034/35

Baseline Supply Demand Balance (% of surplus/deficit over Demand + Target Headroom)						
WRZ	**2009-10**	**2014-15**	**2019-20**	**2024-25**	**2029-30**	**2034-35**
London	1%	-4%	-10%	-13%	-14%	-15%
SWOX*	-5%	-8%	-12%	-14%	-14%	-14%
SWA*	18%	18%	15%	12%	11%	11%
Kennet Valley*	25%	18%	13%	10%	8%	7%
Guildford*	11%	11%	8%	6%	4%	3%
Henley*	30%	30%	27%	24%	21%	19%

*Critical period 'ADPW' driver rather than DYAA

7 Appraisal of Supply Demand Options

Volume 2, Section 7 has been updated to include:

- an updated feasible option list including new resource developments such as regional transfer schemes, desalination and effluent re-use schemes.
- re-assessed costs for existing feasible options to ensure consistent with current market conditions.
- further economic analysis of leakage reduction, including customer willingness to pay for reduction in leakage beyond the economic level of leakage (ELL).
- reviewed cost-benefit analysis of metering strategy and its deployment schedule
- a revised water efficiency programme to account for the new regulatory targets and changes to the above.

☛ *Volume 2, Section 7*

We have identified that in London and SWOX WRZs there will be insufficient water available to meet planned levels of service. We therefore need to review the different options available to us and determine which combination of options, or programmes, is the best in terms of meeting the supply demand deficit, maintaining low costs for customers and minimising environmental and social impacts.

We follow the "twin track approach" in balancing supply and demand. This means demand management programmes of leakage reduction, metering and water efficiency are considered alongside water resource scheme options to provide a twin track solution to the planning problem. In recognition of wider sustainability considerations, the preferences of our stakeholders and the Company's Strategic Direction, demand reduction was prioritised in developing programmes.

A full range of supply and demand options were investigated to identify potential solutions to the supply demand deficits. As set out in the EA's WRPG, the identification and selection of options is a three-stage process: a 'generic' options list (a high-level list of potential options by type); an 'unconstrained' options list (a full list of potential options that could be developed under each of the generic options); and a 'feasible' list – the schemes considered to be suitable for development. At the generic and unconstrained stages, each option is considered and assessed for suitability against a range of criteria including:

- Applicability – Is the option within water company control?
- Technological feasibility – Is the technology available to realise the option?
- Environmental impact – Are there known environmental issues?
- Social impact – Are there known social issues?
- Relevance to investment driver – Does this scheme help to achieve the supply demand balance?

The demand management and water supply scheme options included in the feasible list are then scoped and assessed for cost, environmental and social impact (including carbon) before undergoing comparative econometric assessment against demand-side options as set out in the industry approved Economics of Balancing Supply and Demand (EBSD) methodology[4].

The detailed environmental and social assessment of demand management and supply schemes is reported in Volume 5.

☛ *Volume 2, Section 7.1.2*

☛ *Volume 5 (Assessment of Alternative Schemes)*

Water Resource Schemes

In total, 88 water resource schemes (8 of which were multi-zone reservoir or transfer schemes) were identified in the feasible list of options and included a range of traditional schemes such as groundwater and reservoir development through to innovative schemes such as Aquifer Storage and Recovery (ASR), desalination and effluent re-use.

☛ *Volume 2, Section 7.2*

For the purposes of water resource planning in the South East of England a joint forum, the Water Resources in the South East (WRSE) group, has been set up to consider opportunities to optimise the selection of water resource solutions amongst water companies in the South East. A regional model has been set up to assess options for transfer of resources between company supply areas.

Based on draft WRMP data the WRSE modelling suggests that there is potential for further inter-company transfers. An update of the model using rdWRMP data is underway.

☛ *Volume 2, Section 4.3*

Demand management

☛ *Volume 2, Section 7.3*

Demand management measures, primarily leakage reduction, metering and water efficiency are traditionally viewed in isolation from each other. In reality, all the options are inherently linked and in the draft WRMP we have proposed an integrated approach to Demand Management, called the IDM approach.

IDM is defined as:

> "The integration of demand management activities including leakage reductions, metering and water efficiency programmes to produce a single, efficient PR09 demand management strategy."

[4] UKWIR (2002) *The Economics of Balancing Supply and Demand (EBSD) Guidelines. Report Ref: No. 02/WR/27/4.* UKWIR. London

For example, in an area where we replace mains, we would also install meters and promote water efficiency activity at the same time.

This approach draws on the synergies and overlaps between the separate elements of the demand management strategy to maximise demand savings whilst minimising duplication of activity and therefore cost. We will align our demand management programmes using the District Metering Area (DMA) as the fundamental unit of study and will build upon that already used to target DMAs in which we undertake mains replacement. Outside of London, where leakage is already low and reduction is not such a driver for investment, metering and water efficiency will be carried out in tandem.

We believe that an IDM approach is the most sustainable and economic way to undertake significant programmes of demand management work. The scale of the programme included in our rdWRMP has been informed by the priorities of our customers, economic and sustainability principles and considered within the context of the 25-year Company Strategic Direction Statement.

☛ *Volume 2, Section 7.3.1*

The main demand management activities are outlined below.

Leakage Reduction

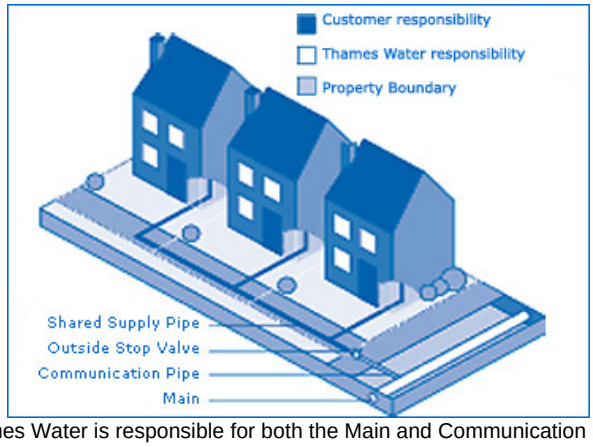
Ongoing mains replacement and active leakage control are required to hold leakage at the current level. In particular, mains replacement, undertaken as part of our capital maintenance programme, is required to offset deterioration of the aging supply infrastructure. Action in addition to this 'steady state' level is required to reduce leakage.

The results of our customer research for PR09 showed that customers want us to reduce leakage beyond the economic level [5] to between 15% and 20% of distribution input, this will bring our performance in line with the rest of the industry. The options available are mains replacement, Active Leakage Control (ALC) comprising 'Find and Fix', pressure management/zonal reconfiguration, and customer supply-pipe leakage reduction.

In London, it has been demonstrated that maximum benefits are gained when all the old iron mains within a DMA are replaced. To date, the mains replacement programme has completed construction in 90 DMAs across London. Detailed information is being recorded on techniques used, production rates, costs, proportion of mains abandoned and leakage outputs. We analyse these assessments to understand the performance of the network before and after replacement in order to inform future leakage strategy.

The mains replacement programme has included the replacement of communication pipes as shown in Figure 6 and installation of meters at the boundary of properties to allow targeting of customer side leakage. We have also developed in-house technology, the *Leakfrog*, to improve our ability to identify customer-side leakage and wastage.

[5] The Economic Level of Leakage is the level at which it would cost more to make further reductions in leakage than to produce the water from another source.



Thames Water is responsible for both the Main and Communication pipes.

Figure 6: Typical Pipe Layout for Domestic Customers

The areas that we have already upgraded, all show a marked performance improvement with repair rates falling to almost zero and almost no response to weather conditions. Consequently, operating costs are also markedly reduced in these upgraded areas.

A range of mains replacement options in London were tested in our modelling work and the performance of the associated supply demand programmes appraised. Leakage reduction profiles were reviewed against programme cost and wider impacts to develop a sustainable level of leakage profile.

☛ *Volume 2, Section 7.3.2*

Metering

The Company's preferred method of charging for water is to charge customers via a metered tariff, as we believe it is the fairest way to pay for water. Metering is supported by the UK Government's recently published water strategy, *'Future Water'*, which highlighted increasing meter penetration as an important goal. In addition, changes to secondary legislation enable a water company, if identified as being in an area of serious water stress (as is the case for Thames Water), to gain approval from the Secretary of State to adopt a compulsory targeted metering policy.

There are two alternative options to increase the level of metering penetration, firstly metering on change of occupancy and secondly, compulsory metering. Our experience from change of occupancy metering trials undertaken since 2005 has shown that introducing metering in this way is an expensive approach to increase the level of metering and tends to focus on the lower end of the housing portfolio where the majority of house moves occur.

We are therefore proposing a 15-year progressive programme of targeted compulsory metering of households starting in 2010. This will enable metering to be delivered in a targeted manner, which we believe will be more cost effective and will result in minimum or deferred impact on vulnerable groups.

We will continue to install meters on new or converted properties, plus properties where a swimming pool is owned or sprinkler is used, or when a customer request a meter (optant).

☛ *Volume 2, Section 7.3.3*

Tariffs/Automatic Meter Reading/Affordability

Increasing the extent of metering across our supply area means we are able to consider the use of more sophisticated tariffs in order to manage affordability issues and further reduce demand, particularly at peak times, for example, during the summer months. Consequently we have proposed the introduction of sophisticated tariffs from 2017/18 when the level of meter penetration is considered sufficiently high to make this option effective. For modelling purposes a 5% reduction in PCC has been assumed when more sophisticated tariffs are in place. This is in addition to the reduction in PCC assumed when a property is metered.

☛ *Volume 2, Section 7.3.3.3*

However, more fieldwork is required to better understand the most effective tariff options in association with Automatic Meter Reading (AMR). For example, we are aware that moving to a tariff based primarily on volumetric usage, whilst being a fairer way to pay, may adversely impact large families on low incomes. In this respect, tariffs can also be used to mitigate the effect of metering on those least able to pay.

☛ *Volume 2, Section 7.3.3.4*

We therefore propose to undertake a set of large-scale tariff trials during AMP5 (2010/11 to 2014/15) to refine our policy for the use of more sophisticated tariffs, with a view to rolling out company wide changes to our charges scheme from 2017/18 The trials are likely to be in London & SWOX given their higher level of meter penetration and supply demand position.

In the meantime, we will continue to track progress with tariff developments across the industry and abroad, working closely with the EA, Greater London Authority (GLA) and other companies to understand the practicalities and advantages of tariff change.

Water Efficiency

There is widespread support for water companies to do more to promote and facilitate water efficiency. Recent consultations with our customers have revealed a strong customer preference to see more water efficiency education and for us to help our customers make greater use of water efficient technologies. Ofwat has stated that it wants to see more sophisticated water efficiency activities that exhibit good value for money. The EA has stressed the importance it places on water efficiency.

Our current (or baseline) water efficiency programme includes wider communication, promotions of cistern displacement devices and water butts, an education programme targeting schools and higher education institutions, and partnership activities to continue to effectively promote the water efficiency message. This baseline programme is designed to achieve the new regulatory target in place from 2010.

In addition to the baseline programme, an enhanced water efficiency programme has been developed supported by the clear stakeholder preference for us to do more. This programme includes the dovetailing of domestic audits with a compulsory metering programme, to offer customers the opportunity to save water when metering provides a financial incentive for doing so. Commercial properties will also be targeted through a commercial audit programme and subsidised activity.

☛ *Volume 2, Section 7.3.4*

8 Programme Appraisal

Volume 2, Section 8 has been updated to include:

- Reviewed programme appraisal and Strategic Environmental Assessment (SEA), accounting for changes to data in the preceding sections.

☛ *Volume 2, Section 8*

Where there is a supply demand deficit in a WRZ, a planning solution needs to be identified which will rapidly restore and then maintain security of supply over the planning period. The solution also needs to satisfy a range of other considerations such as cost, environmental and social impact, programme risk and alignment with company strategic direction and customer preferences.

The EBSD methodology in combination with the Strategic Environmental Assessment [6] (SEA) process was used to identify a least cost 'sustainable' programme of options, which best satisfies the full range of considerations. The framework used is based on UKWIR guidelines of 'Economics of Balancing Supply and Demand' and of Strategic Environmental Assessment.

The process requires a number of alternative programmes to be tested and appraised. These programmes were steered by a range of alternative policies with regard to cost, carbon emissions, environmental and social impacts and the management of strategic resource requirements.

The aim of the SEA was to help to produce a more sustainable plan that avoids major impacts on people and the environment, and provides environmental benefits where possible. An economic model (EBSD) is used to test the alternative scenarios and to produce performance indicators by which the programmes can be compared.

☛ *Volume 6, Environmental Report (SEA) and Addendum*

The preferred programme for each WRZ is one which closes any resource deficit as quickly as is practicable as well as being the best balance of all sustainability criteria including financial cost, environmental and social impacts and programme risk.

Carbon impacts are noted as being a particularly important consideration in the long term

[6] UKWIR (2007). Strategic Environmental Assessment – Guidance for Water Resources Management Plans and Drought Plans (07/WR/02/5). Available at http://www.ukwir.org/ukwirlibrary/91912

9 Preferred Supply Demand Investment Programmes

Volume 2, Section 9 has been updated to reflect:

- lower demand forecasts resulting from the changes highlighted in the earlier sections
- revised mains replacement outputs, now 1,000km in AMP5 and 2,000km in AMP6. Capital maintenance mains replacement increased to offset leakage deterioration.
- extension of the targeted compulsory metering programme from 10 to 15 years and deferment of introduction of sophisticated tariffs to 2017/18.
- deferment of UTR until AMP8, and the reduced the size of the scheme to 100Mm^3. Additional groundwater resources in AMP7 to maintain security of supply for London WRZ in the interim.

☛ *Volume 2, Section 9*

The preferred programmes for each WRZ are described below with the supply demand balances associated with the preferred programmes for each water resource zone given in Table 2, figures are presented DYAA for London and ADPW for Thames Valley zones.

The major demand management programmes in the SWOX zone significantly mitigate baseline supply demand deficits, but are not able to restore security of supply at the start of AMP5. There is a lack of supply options that can be delivered within these timescales.

Table 2: Supply Demand Balances for Preferred Programmes

WRZ	Volume (Ml/d)								
	AMP5					End AMP6	End AMP7	End AMP8	End AMP9
	2010-11	2011-12	2012-13	2013-14	2014-15	2019-20	2024-25	2029-30	2034-35
London	27	27	19	13	7	2	11	152	120
SWOX*	-8	-5	3	3	1	2	-1	22	23
Kennet Valley*	35	35	28	28	26	21	23	22	21
SWA*	34	34	34	33	32	30	35	34	34
Guildford*	8	8	8	8	8	7	10	10	9
Henley*	6	6	6	6	6	6	6	6	6

*Critical period 'ADPW' driver rather than DYAA

☛ *Volume 2, Section 9.3*

Components of the Preferred Programmes

☛ *Volume 2, Section 9.2*

Demand Management

A progressive targeted compulsory metering programme in combination with an enhanced programme of water efficiency activities forms part of the preferred programme for each WRZ. This is consistent with the company's commitment to sustainable development, the Strategic Direction Statement and in recognition of the wider benefits of demand management. This activity will be delivered over a 15-year programme and will be prioritised to those WRZs with greatest need. Water efficiency activity is undertaken on a rolling basis and continues to the end of the planning period.

Although the SWA, Kennet Valley, Guildford and Henley WRZs are in surplus, we have extended the metering and water efficiency programmes to include these zones. We have chosen to do so as it aligns with our strategic vision and the Government's water strategy to increase meter penetration and water efficiency awareness across the whole supply area. Increasing metering will also allow our customers to pay for the water they use, which is a fairer way of charging. We also feel that it is vital that our approach is seen to be consistent across the company when the whole supply area has been designated as seriously water stressed.

Additionally, it is a recommendation of the Environmental Report (Volume 6) that demand management measures should be maximised to provide sustainability benefits associated with reduced demand.

☛ *Volume 2, Section 9.2.2*

Leakage reduction is proposed in both London and SWOX. In London, a mains replacement policy of an average of 200km per annum in AMP5 and 400km per annum in AMP6 was found to be the optimum strategy. The programme will address the AMP5 deficits and associated security of supply risk. This mains replacement policy is in addition to that included in the capital maintenance programme to mitigate asset deterioration; the synergies between the two programmes have been fully explored to ensure optimum cost benefit.

Studies are planned for AMP5 to inform the best strategy for further leakage reduction in the long-term, which could include, for instance, the targeting of leakage in trunk mains. The diminishing benefit of mains replacement over time (due to the preferential targeting of DMAs with best cost benefit) is recognised.

In addition, leakage reduction through extra active leakage control activity is planned in AMP5 for both London and SWOX. This activity is required to reduce the timescales over which security of supply is restored in both zones. Mains replacement is not a preferred policy in SWOX due to the poor cost benefit associated with the low leakage rates per kilometre in this zone.

In London the preferred leakage profile is considered to be the 'sustainable level of leakage', whereby reductions have been determined based on our Company aspiration to deliver lower levels of leakage in a sustainable manner. A major programme of mains replacement principally delivers these reductions. Customer preference studies indicate that customers are willing to pay for leakage to achieve levels below the economic level as defined in accordance with existing industry best practice methodologies. Thames Valley WRZs leakage levels are already in line with the industry average.

To achieve such significant reductions in leakage it is critically important that sufficient funding is allocated to manage recurrence in those parts of the network where it is not cost beneficial to undertake mains replacement for supply demand purposes.

The resulting leakage profiles are presented in Table 3 and Table 4 below.

Leakage programmes are developed then assessed for leakage uncertainty before being considered within the overall supply demand planning process, Confidence levels of 80% have been selected for the AMP5 period. This assessment takes account not only of the delivery of the leakage target within a single year, which can be impacted by immediate leakage control performance and weather, but also the fact that with further leakage reductions throughout AMP5, failure to deliver the target in one year make the next years target more difficult to achieve. The confidence of delivery of the leakage target assumes that capital maintenance investment will maintain the condition and performance of the network. For leakage management, this needs to consider bursts (mains, fittings and service pipes), network operation, pressure management and leakage itself and without it leakage targets will not be met.

Table 3: Annual Average Leakage Targets by WRZ (Ml/d)

Resource Zone	End AMP4	End AMP5	End AMP6	End AMP7	End AMP8	End AMP9
	2009-10	2014-15	2019-20	2024-25	2029-30	2034-35
London	563	481	406	394	394	394
SWOX	55	52	52	52	52	52
SWA	32	32	32	32	32	32
Kennet Valley	25	25	25	24	24	24
Guildford	9	9	9	9	9	9
Henley	3	3	3	3	3	3
Thames Water	**688**	**602**	**527**	**514**	**514**	**514**

Table 4: Annual Average Leakage Targets by WRZ (l/prop/day)

Resource Zone	End AMP4	End AMP5	End AMP6	End AMP7	End AMP8	End AMP 9
	2009-10	2014-15	2019-20	2024-25	2029-30	2034-35
London	204	168	133	123	118	114
SWOX	133	118	110	104	99	95
SWA	162	155	147	137	132	128
Kennet Valley	160	152	144	135	129	125
Guildford	145	141	135	127	122	118
Henley	161	158	151	141	137	134
Thames Water	**190**	**160**	**132**	**122**	**117**	**113**

☛ *Volume 2, Section 9.2.3*

Water Resource Schemes

We consider that the Upper Thames Reservoir (UTR), described in the following tables as UTR – 100Mm^3 is the preferred option to maintain security of supply in both London and SWOX WRZs.

This major resource is able to meet our customers' needs for the foreseeable future, with surplus available in the medium and longer term to provide bulk supplies to neighbouring water companies if required. This resource would be available from AMP8 onwards and is supported by ongoing leakage reduction and water efficiency activity.

In the longer term the potential impact of climate change on deployable output is significant. A major resource is required to manage this uncertainty and to provide the best possible security of supply to both Thames Water customers and the wider South East. The capacity of the UTR will be increasingly used after 2025/26 and a resource of this size represents the optimum solution to manage the significant uncertainty associated with climate change.

In London, relatively small-scale groundwater source development is also required in the medium term in addition to demand management activity to maintain security of supply. In SWOX, the development of a number of sources, particularly in the Goring area is required to restore and maintain security of supply during AMP5 and AMP6.

We also intend to continue our current research and development programme into effluent re-use, particularly in London where treated effluent is discharged to the tideway and also innovative groundwater options such as Aquifer Storage and Recovery (ASR). We are investigating the feasibility and acceptability of an indirect potable reuse scheme at Deephams Sewage Treatment Works.

Discussion by Water Resource Zone

London WRZ

London has a growing deficit (dry year annual average in the baseline scenario from 2012/13. A substantial demand management programme is required in the preferred programme (Figure 7) to maintain a surplus to headroom from 2013/14 through AMP6. A moderate groundwater resource programme is required to maintain surplus in AMP7, before the UTR provides sufficient deployable output to provide surplus in the London WRZ for the foreseeable future.

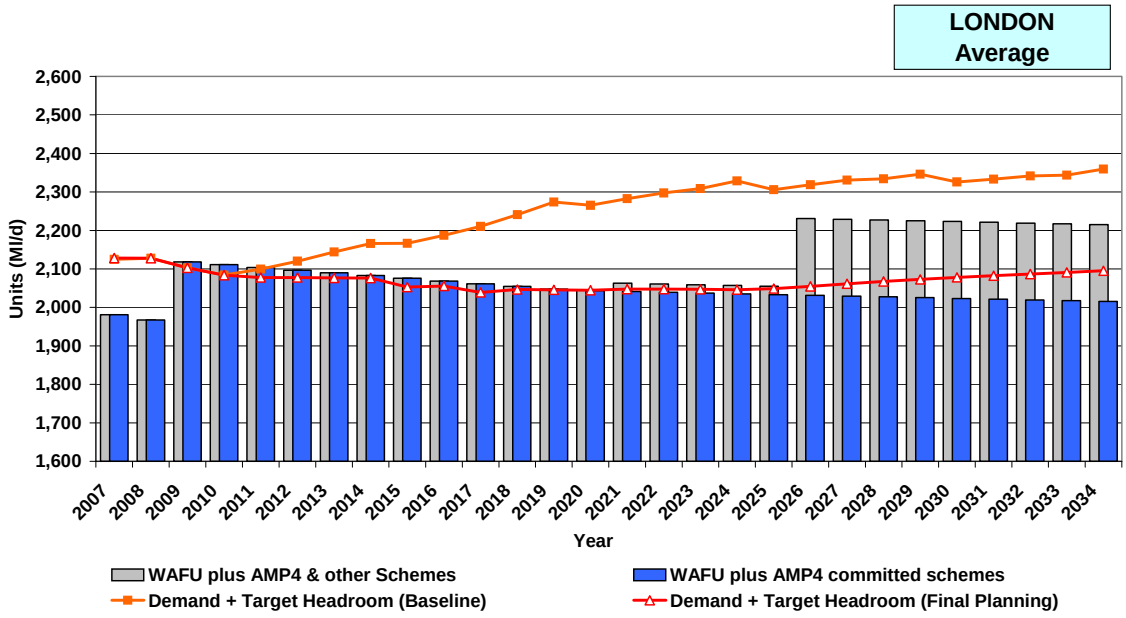


Figure 7: Preferred Programme – London DYAA

Building on the AMP4 baseline programme, the key elements of the preferred programme are as follows (Table 5):

Table 5: London WRZ Preferred Programme

Option		DYAA Yield (Ml/d)[7]	Delivery year(s)
Demand	Leakage saving (mains replacement, enhanced ALC and metering programme)	159	2010-2025
	Consumption saving (Metering, water efficiency and tariffs)	70	2010-2025
Supply	ELRED	1	2020/21
	Northern New River 1	2	2020/21
	SLARS	19	2021/22
	UTR (100Mm^3)	178	2026/27

[7] For demand management options yield quoted is saving in 2020

Leakage reduction forms a key component of the plan, with leakage levels in London reduced by more than a quarter in absolute terms by 2020. This is achieved by an ongoing mains replacement programme of 200km per annum in AMP5 and 400km per annum in AMP6, in combination with enhanced find and fix activity in the short term.

Targeted compulsory metering and water efficiency are also significant elements of the preferred programme, with metering delivered over a 15-year programme and enhanced water efficiency ongoing until the end of the planning period. A metering penetration level of 77% of individual properties is achieved in London by 2025, with a meter fitted to all supplies over the same period.

The UTR is required in 2026/27, this is able to meet resource requirements until the end of the planning period, with a surplus potentially available to other water companies in the South East if required.

☛ *Volume 2, Section 9.3.1*

SWOX WRZ

SWOX also has a significant deficit (peak week) throughout the planning period for which a substantial investment programme is required. The preferred programme eliminates the deficit by 2012/13 and maintains the supply demand balance throughout the remainder of the planning period as shown in Figure 8.

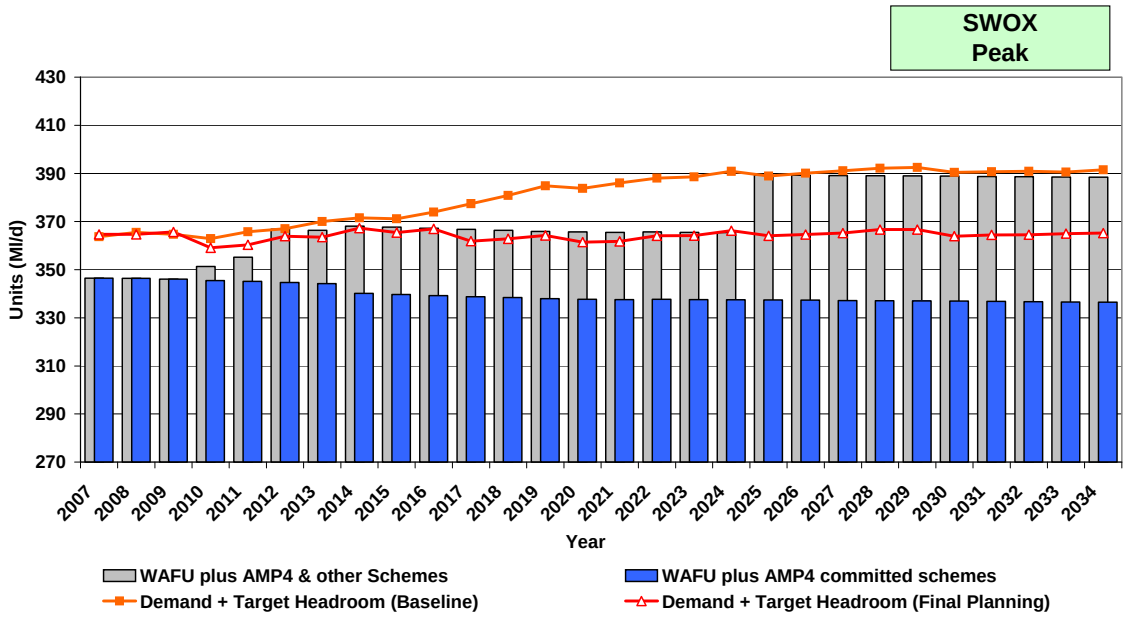


Figure 8: Preferred Programme – SWOX ADPW

A full demand management programme of leakage reduction, metering and water efficiency is included in the preferred programme. The delivery of the metering and water efficiency programme in SWOX will be prioritised over other Thames Valley resource zones in order to reduce AMP5 deficits as quickly as possible. The extent to which demand can be reduced through leakage reduction is limited due to the already low leakage levels in SWOX, which are below average for the industry.

With an optimised demand management programme, the restoration of the supply demand balance as quickly as possible is then dependent upon the delivery of a series of small-scale groundwater options and the removal of constraints by the end of AMP5. Once implemented, together with the demand management programme these options are sufficient to maintain target headroom (TH) until the UTR is required.

The tariff trials planned for AMP5 will be undertaken in SWOX, due to the fact that this zone already has a relatively high level of meter penetration (achieved through change of occupancy metering during AMP4) and a clear supply demand driver to accelerate demand management as far as possible. These trials, undertaken as a precursor to the implementation of a company wide tariff structure in AMP6, are likely to reduce the supply demand deficits further in this zone during AMP5.

The programme also allows for a reduction in abstraction at the Axford groundwater source of 3.6 Ml/d on peak week supply in 2014/15 and is only achievable once the WRZ is in surplus. This reduction is for sustainability reasons as agreed with the EA.

Table 6: SWOX WRZ Preferred Programme

Option		ADPW Yield (Ml/d)[8]	Delivery year(s)
Demand	Leakage saving (enhanced ALC and metering programme)	5	2010-2020
	Consumption saving (Metering, water efficiency and tariffs)	21	2010-2020
Supply	Goring Gap 1	4.5	2010/11
	SWOX NC1	1.0	2010/11
	SWOX NC2	0.3	2010/11
	Lambourn Down	0.9	2011/12
	SWOX NC3	2.0	2011/12
	SWOX NC4	1.0	2011/12
	SWOX NC5	0.3	2011/12
	Goring Gap 3	10.0	2012/13
	SWOX NC6	2.1	2012/13
	Goring Gap 2	5.8	2014/15
	UTR (100Mm^3)	24.0	2025/26

☛ *Volume 2, Section 9.3.2*

Kennet Valley, Slough Wycombe and Aylesbury, Guildford and Henley WRZs

No deficit on either unrestrained annual average or peak week conditions is forecast to occur over the planning period in these zones. Therefore, the preferred programmes contain no new investment in either leakage reduction or resource development. The economic level of leakage for these resource zones is therefore the current level of leakage, with an allowance for growth in leakage due to new properties and customer side leakage savings from the metering programme.

With the inclusion of metering and water efficiency activity in the preferred programmes, the solution is not true least financial cost (cost impact shown in sensitivity analysis in Section 8). However, when the overall benefits are taken into account, this strategy is considered to be the optimum and most sustainable solution for these zones.

☛ *Volume 2, Section 9.3.3-9.3.6*

[8] For demand management options yield quoted is saving in 2020

10 Sensitivity Testing

Volume 2, Section 10 has been updated to include:

- revised sensitivity testing to account for changes in the data in preceding sections.
- updated contingency options that can be utilised to mitigate sensitivity risks, should demand management activities not deliver the anticipated level of savings.

We have tested the robustness and resilience of the preferred programmes through sensitivity testing.

☛ *Volume 2, Section 10*

The range of potential sensitivity tests is large; the following areas were identified as the most significant in terms of impact on demand and are included in this analysis:

- Population – rate of domestic population and housing growth
- Per Capita Consumption (PCC) – rate of change
- Metering – impact of selective metering savings on domestic consumption
- Economic Downturn – Severity of economic downturn

☛ *Volume 2, Section 10.2*

The sensitivity testing supports the development of a programme of contingency options to manage the risk posed by uncertainty around assumptions made in the development of the preferred plan. If additional resources are required, these contingency options help ensure sufficient water resource options are available to be implemented in the timescales required to maintain supply surplus.

11 Summary of the Main Elements of the Preferred Programme

The key elements of the revised draft WRMP are set out below:

- Further significant reductions in leakage through a continuation of the Victorian Mains Replacement (VMR) programme in London and additional active leakage control in London and SWOX. This will result in the reduction in leakage by 23% in absolute terms to 527 Ml/d by 2020, with further ongoing reductions thereafter.

  ☛ Volume 2, Section 9.2.3

- A 15-year progressive programme of targeted compulsory metering, with the aim to individually meter all domestic properties where it is cost beneficial to do so. We believe that this will result in an overall individual household meter penetration of around 80% by 2025 and the metering of all connected properties.

  ☛ *Volume 2, Section 9.2.2*

- An enhanced water efficiency programme, whereby we will offer water efficiency activity (advice, technology and audit) to every domestic customer in tandem with our metering programme over the next 15 years.

  ☛ Volume 2, Section 9.2.2

- An Integrated Demand Management (IDM) approach to the planning and delivery of the leakage, metering and water efficiency programmes will be used to maximise the synergies between them. This will optimise the cost benefit and be more sustainable than separate programmes.

  ☛ Volume 2, Section 9.2.2

- Development of water resources where demand management alone cannot balance supply and demand. Key schemes include:

  - Groundwater development in the Goring Gap by 2014/15;
  - Upper Thames Reservoir (UTR) in AMP8.

  The inclusion of the UTR will provide resilience against future uncertainties, including climate change and also provides for a possible strategic resource for the South East.

  ☛ *Volume 2, Section 9.3.1 and 9.3.2*

- Sensitivity testing of the final programme has highlighted that it is prudent to continue research and development to assess 'contingency options', should anticipated demand management savings not be realised or supply schemes yield less than expected. We intend to continue our investigations into effluent re-use, particularly in London where treated effluent is discharged to the tideway and also innovative groundwater options such as Aquifer Storage and Recovery (ASR).

☛ *Volume 2, Section 10*

Overall, challenging programmes of demand management are required in the short to medium term in order to offset and reduce the underlying increase in demand for water. Demand management alone however is not sufficient to balance supply and demand into the future and water resources schemes, focusing on groundwater development in the Goring Gap and the UTR, are required.