

**Part B5 – Supply/Demand Balance (Water)****Summary Report by REPORTER****Summary of Audit Findings & Reporter Opinion**

The Company has undertaken significant and credible work since the Draft Business Plan (DBP) to inform the Final Business Plan (FBP) in rapidly changing economic circumstances. Audits confirm this work is robust and forms a reasonable basis for planning within the range of uncertainties relating to population growth and downgrades of commercial and residential consumption over the AMP5 period.

The Company's preferred programme has been significantly revised in response to smaller deficits and heightened affordability issues due to change in economic climate. The main changes from DBP are:

- Deferral for 5 years of the Upper Thames Reservoir (UTR) and revised programme for resource development
- Halving the scale of VMR 2000km to 1000km in the revised WRMP (400km in the FBP, due to the deferral of expenditure related to climate change in the final three years of AMP5, as discussed below.)
- Reduction in the pace of metering from a 10 to 15-year programme in London and 10-year programme in SWOX. The rate of metering is also impacted by the deferral of expenditure related to climate change in the final three years of AMP5, as discussed below.
- Reduced scale and pace of leakage reduction

The Company has removed a significant proportion of climate change driven investment from its final plan pending the update from the UKCP2009 findings. For activities where the investment is either partially or entirely climate change driven, the Company has included investment costs and outputs for only the first two years of the planning period (2010/11 and 2011/12) within the FBP. The Company intends to submit an update to this plan once this information becomes available to justify the investment required for the last three years of the five-year period.

Demand management plays a considerable role in restoring the supply demand balance.

The Company has significantly reduced the forecast demand for water across its supply area. The Company reports that this reduction has been driven by several factors:

- The impact of the economic downturn (on housing growth and commercial use);
- revised population and household forecasts;

- a review of the micro-components of household water use;
- a review of the assumptions used for water use in new build properties; and
- potential recovery of water use following a reduction in the 2006 drought and subsequent wet years, referred to as 'bounceback'.

The Company is still predicting supply demand deficits in both the London and Swindon & Oxfordshire Water Resource Zones, however these equate to reductions of around 30 to 40 per cent compared to forecasts in the draft Plan. The Company is still predicting that the remaining WRZs will be in surplus, however, changes to the demand forecast indicate that this will be higher than predicted in the draft Plan.

This Summary Report discusses the major changes from the Draft Business Plan submission.

We are satisfied with the Company's submission and that it has used the best possible information available at the time to predict the impact of the economic downturn on the supply demand balance.

### **Reporter Engagement & Scope of Audit**

Our audits covered Thames Water's data tables and supplementary information, covering all aspects identified in the Ofwat's Business Plan Reporting requirements for Part B5 (Maintaining the Supply / Demand Balance) and Company Specific Guidance (February 2009), checking for completeness and consistency with the dWRMP and the DBP.

An initial briefing on the Company's Part B5 information took place at the Company's Clearwater Court offices in Reading on Monday 9<sup>th</sup> March 2009. This was followed by audits on Friday 13<sup>th</sup> March and Friday 20<sup>th</sup> March.

Our approach to the audit of Part B5 has involved interviews, desktop study, and review of documentation, methods, procedures, and data used to generate the table entries and line by line commentary for the Final Business Plan. We also reviewed arithmetical calculations, methods, assumptions and consistency with the draft Water Resources Management Plan (dWRMP) which we audited in depth in February and March 2008 and the DBP which we audited in July and August 2008. We have also reviewed the Statement of Response submitted to Defra on 27 February 2009.

We have liaised with Ofwat and the accompanying checklist addresses specific points in Ofwat's Reporter guidance and addresses all the points in the agreed Audit plan, including the Company specific guidance. Where further detail is required it is included in this summary statement.

## Summary of Thames Water's Proposals

There have been significant changes made to this chapter of the Company's submission, both in response to representations received on the dWRMP and also based on the additional work carried out by the Company since submission of the DBP.

The Company has made significant reductions to its demand forecast from the dWRMP and DBP. This has had a considerable impact on the planned programme of works, including the programme of leakage reduction through mains replacement in London, the compulsory metering programme, the enhanced programme of water efficiency, the delivery of a number of relatively small resource options and the timing Upper Thames Reservoir.

The reduction in the demand forecast has been driven by several factors:

- The impact of the economic downturn (on housing growth and commercial use);
- revised population and household forecasts;
- a review of the micro-components of household water use;
- a review of the assumptions used for water use in new build properties; and
- potential recovery of water use following a reduction in the 2006 drought and subsequent wet years, referred to as 'bounceback'.

Each of these factors is discussed in more detail below, as well as the changes the Company has made to its climate change assessment.

The Company reports that despite this reduction there still remains a substantial supply demand deficit throughout the planning period in both the London and SWOX WRZs, albeit smaller at around 30 to 40 percent of the original forecast deficit. The remaining WRZs are in surplus and in Kennet Valley, SWA and Henley this surplus has increased while in Guildford it is slightly reduced.

We note that there is significant uncertainty associated with this plan. Despite this uncertainty, we are satisfied that the Company's assumptions are reasonable given the information available. The assumptions made with respect to housing and population are crucial to assessing the deficit in London and SWOX WRZs and therefore timing of investment.

The Company highlights that the EA's view on future sustainability reductions will also be crucial in the medium to long-term, particularly with regard to the reservoir size and timing and the possibility for regional transfer as advocated in its recent Water Resources Strategy. The Company has not included the requirement for sustainability reductions within the underlying planning

assumptions (beyond those notified by the Environment Agency) and highlight that this would result in an increased need, bringing forward the requirement for investment.

## Differences from dWRMP and DBP

### 1. Impact of the economic downturn

#### Impact on housing growth

Since development of the DBP the economic downturn has had a significant impact on the Thames Water area, as for the rest of the UK. The Company therefore sought advice on how this might affect growth in population and households and commissioned Cambridge Econometrics (CE) to determine the likely impact. This report was produced in December 2008.

To inform our audit we sought an external review of this study by an economist within Halcrow and conclusions were that CE's forecasts seem to have been made on a sound basis (full report included in Appendix B5.C for reference only, though it must be understood that these do not necessarily inform the Reporter's opinion). Some of these forecasts however, particularly those relating to economic growth, are superseded as there have been drastic changes in the economic climate since completion of the report. The major issues highlighted were:

- Overall Gross Value Added (GVA<sup>1</sup>) growth predictions for the UK economy for 2008 and 2009 look too optimistic in the light of a recent deterioration in the economy. The 2008 forecast was underestimated by a quarter of a percent, while the 2009 forecast would represent no further contraction in the UK economy from its position in the final quarter of 2008.
- GVA growth forecasts for Thames Water supply and sewerage areas are too high. Based on this, the UK figures overall should probably be downgraded, which would lead to downwards revision of the Thames Water area figures. The forecast for London in particular appears to be significantly over-optimistic, with other forecasts suggesting it could be 2% lower.

---

<sup>1</sup> CE's forecasts use Gross Value Added (GVA) as a measure of output rather than the more familiar GDP. GDP is more widely used to measure the overall performance of an economy, while GVA measures the contribution made to the economy by industries, and so can allow sectors of the economy to be compared. The two measures are broadly the same, but GVA does not include product taxes, such as VAT, and does include subsidies on products in its output accounting.

- The GVA growth figures quoted in the tables do not tally with the impression given by the text that the Thames Water areas will perform worse than the UK overall.

We challenged the Company with the above, based on the impact on the FBP and significance in driving investment. The Company's response is that the report was carried out in time for completion of a demand forecast for the FBP and therefore could not include the most up to date information available at the time of audit. We are satisfied with the Company's response, particularly given the uncertainty associated with economic recovery in AMP5. The Company has made the best estimate possible with the information available, however we recommend that population and property forecasts are re-evaluated once the revised climate change impacts have been included.

#### Impact on commercial use

The economic downturn is also predicted to reduce non-household use. The Company uses Experian to predict these demands from an econometric model and commissioned Experian to re-run this model in October 2008, to take account of economic downturn. The Company has further adjusted these results to include a reduction of the commercial forecasts, highlighting acceleration of the economic downturn in the remainder of AMP4, reducing non-household demand further.

During our audit, we discussed how the Company has predicted commercial use decline. Following the receipt of the Experian model results, the Company identified a number of key customers who were reducing capacity or closing. The Company reports that more recent information shows that all top 6 customers are either planning to close in 2009 or 2010 or reducing capacity significantly or considering closure for 2010.

We challenged the Company to provide evidence of a dialogue with these customers or other evidence to confirm reduction in demand or close down. Thames Water responded with correspondence from its Customer Centre which confirmed planned reductions in industrial outputs from these customers, or closure with relocation outside of Thames Water's supply area. The correspondence also provided early warning of other, smaller, key customers likely to reduce outputs or close in 2009/10.

We agree with Thames that the full year impact of these reductions and closures will not be seen in 2009 but will flow through into subsequent years. The influence of these businesses also impacts on local suppliers. Whilst it is difficult to assess the wider impact it is fair to assume that smaller local companies could be similarly impacted.

It is also fair to assume that these customers would not be easily or quickly replaced by other companies who would wish to locate in the Thames Valley,

or London areas. It is also fair to assume that these companies would not necessarily be in the same sector, nor share the same consumption patterns. The change in commercial demand for water is expected to be initially dramatic and sustained during the next 5 years.

Based on this information, the Company further reduced non-household demands by 5% in all water resource zones, maintained over the planning horizon.

We acknowledge that the reduction in non-household customer use is an important consideration for the Company and are therefore satisfied with the reductions made. We note, however, that the depth of the impact of the economic downturn on business is uncertain, and therefore recommend, as with population and property forecasts that these assumptions are checked when the revised climate change impacts are included.

## **2. Updated population and household projections**

Since the DBP was produced there have been significant changes in the population and household projections, largely influenced by the economic downturn as discussed above. As well as this, demographic forecasts have been updated. Figure B5.1 (Figures 3 and 4 from Thames Water's Statement of Response for the dWRMP) below shows the change in population and household projections from the DBP to FBP.

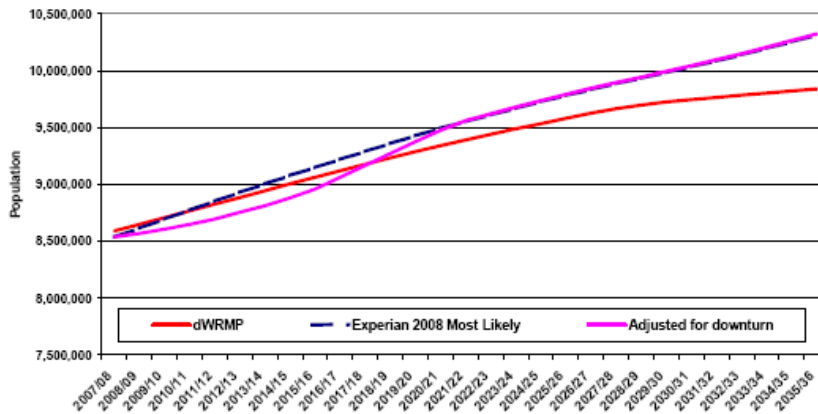


Figure 3: Population projections for the Thames Water supply area

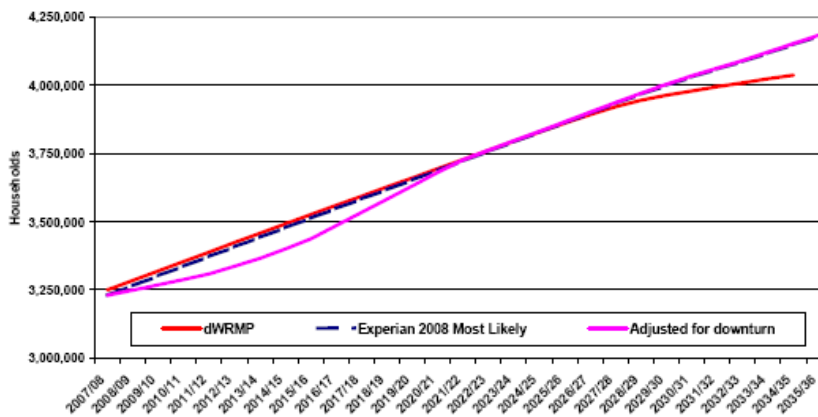


Figure 4: Household projections for the Thames Water supply area

**Figure B5.1 Population and household projection comparison – DBP and FBP**

Demographic forecast changes are reflected in the update to the Experian study and can be seen as the difference between the dWRMP and Experian 2008 ‘most likely’ projections shown in Figure B5.1 above. The Company was one of a number of water companies in the South East England region participating in the Experian study to update the household and demographic data. The data used by the Company is therefore consistent with that used by the majority of companies in the South East (this data also forms part of the WRSE work).

Experian has provided Thames Water with projections of the total population and total number of households within the Thames Water supply area up to 2040. The study produces three projections: policy-based using the updates to draft Regional Spatial Strategies (RSS), including the Secretary of State’s proposed changes to the RSS for the South East, trend-based using the latest (2006-based) Office of National Statistics sub-national population projections;

and the 'most likely' which takes both into account. The Company adopted the 'most likely' scenario and added on clandestines and short-term migrants as in the DBP. These additions have been audited previously by the Reporter and are still considered appropriate.

The Company reports that the demographic changes resulted in an increase in the growth rates for properties and populations. Again, due to the relative importance of the housing estimates we sought a review of this study by an economist within Halcrow full report included in Appendix B5.B for reference only, though it must be understood that these do not necessarily inform the Reporter's opinion.

The major issues highlighted with the Experian study were:

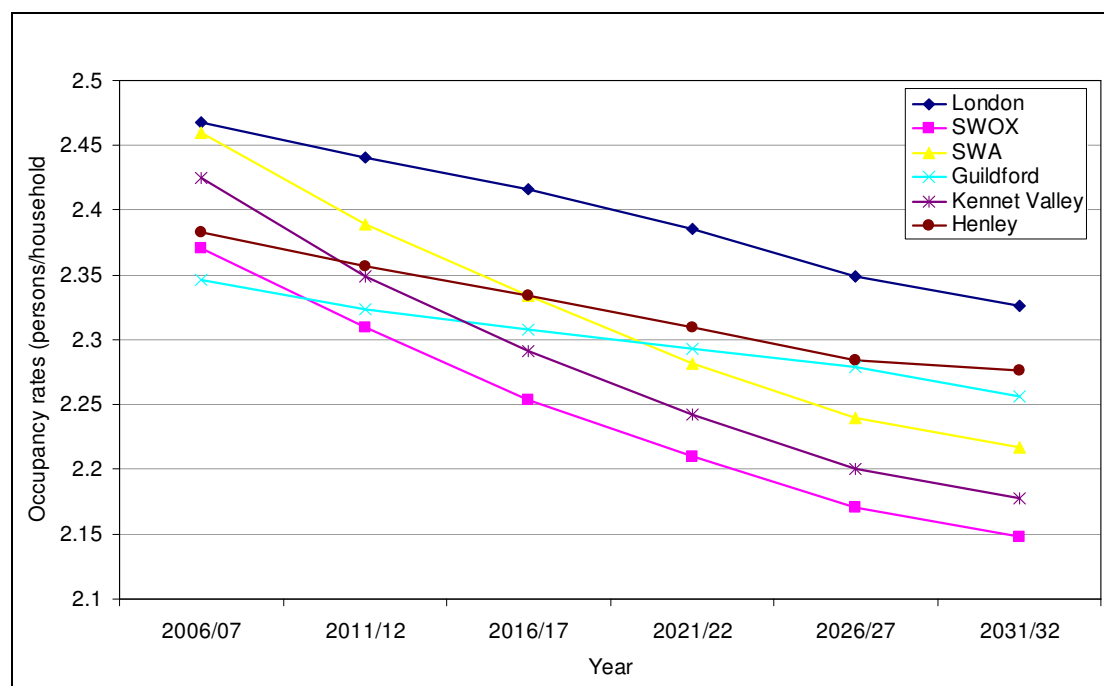
- The 'most likely' scenario is derived by first constraining the policy-based estimate to the trend-based population for England as a whole, and then setting the 'most likely' scenario halfway between the two. The first part of this process causes the most likely scenario to be above both the trend- and (unconstrained) policy-based estimates. The implication of this is that, within the Thames Water WRZs, housing allocations will be upgraded in future to cater for the trend growth in household population in England. Based on this method, 'most likely' projections for population show the total increasing from 8,056,795 in 2006 to 10,197,890 in 2040. This marks an average annual increase of 0.76%. By comparison, the trend-based estimate shows an average annual increase of 0.72%, and the policy-based estimate 0.66%. The number of households increases from 3,390,156 to 4,667,217 between 2006 and 2040, an annual average of 1.08% increase. This method displays a faster rate of household growth than both trend-based (1.04% average annual increase) and policy-based (0.96%) methods.
- As of 2006, 15.77% of the population of England lives within the Thames Water supply area (this figure is derived from Experian and ONS forecasts). Under Experian's most likely scenario forecast, this percentage will increase to 16.00% by 2019. However, under the policy-based projection, the percentage will fall slightly to 15.61% by 2019, and will fall further, to 15.47% by 2030. The implications of this are that the 'most likely' scenario predicts that the Thames Water supply area will grow faster than the nation as a whole. Current policy provisions see the share of England's population living in the Thames Water area fall (London Plan and South East Regional Spatial Strategy).

Experian's methodological guide states clearly that their estimates and forecasts take no account of short-term fluctuations in the economy. Therefore, in order to demonstrate the impact of the economic downturn,

adjustment factors were produced by CE in order to allow the Company to revise population and property estimates. CE re-ran its prediction model, including their view that reduced employment opportunities will have a significant impact on migration and hence on population growth in the area, based on data at October 2008. Forecasts were then compared with those produced for the DBP to produce adjustment factors.

The CE downturn factors were then applied to the Experian projections for the AMP5 period, substantially reducing the Company's view of growth. In the longer term however, the Company has assumed that by 2021 both population and households will recover to the level in the Experian projections. We challenged the Company about this at audit, given the significant level of activity required following the economic downturn to restore housing numbers to be consistent with Government policy for housing growth in the longer term. The Company's response was that it thought that to stimulate the economy, Government would advocate this level of activity. We are not convinced that such an increase can occur, but based on the uncertainty, the chance for review, the fact that the EA's WRPG states companies should use policy forecasts as a basis of their plans and that it does not impact on investment in AMP5, we are satisfied with the Company's estimate.

We have examined the change in household occupancy resulting from the population and property estimates. Occupancy is predicted to decrease across the Thames Water supply area, however we note that there is a relative increase in Henley and Guildford (compared to the other WRZs), whilst London, SWOX, SWA and Kennet Valley occupancies decrease but remain same proportional to each other. We challenged the Company on this trend and their response was that it had resulted from a combination of the methods to produce population and property estimates.



**Figure B5.2 Household occupancy projection comparison**

We also challenged the Company with the comments on the Experian report, as outlined above based on the impact on the FBP and significance in driving investment. The property numbers, produced by an external consultant are the Company's best estimate of growth. Forecasting population growth trends is by its nature an inexact science, and presents a range of methodological and practical challenges. We are therefore satisfied with the Company's estimate, particularly given that there is a chance for review once the revised climate change impacts have been included.

### 3. Micro-components of water use

Between the DBP and FBP the Company has revisited its estimates of household micro-components water use. The public consultation on the draft Water Resources Management Plan (dWRMP) enabled Thames Water to compare its estimates against those of other companies. The Company carried out an internal review with specialist advice from a leading external consultant in water use quantification and water resource planning. The Company also used recent water use studies by DEFRA and WRc's Identiflow datasets for specific micro-components. Thames also drew on anecdotal evidence of customers' habits and use of water.

As a result, Thames concluded that revisions were required in the following areas, where it was considered to be a relative outlier to its peer companies:

- Showers (high estimates of water volume used per shower)
- Toilets (low flush frequency)

- Internal tap use (low usage assumptions).

We reviewed the supporting information to justify changes to its estimates in these three areas.

#### *Showers*

Thames has revised its estimate of shower duration from 8 minutes per shower (67 litres, normal shower) to 5.2 minutes (36 litres normal shower, 67 litres power shower).

This is based upon a review undertaken by Artesia Consulting drawing upon three data sources (WRc Identiflow datasets for new properties and unmetered properties and a Thames Water specific study). We note that these datasets date back to 2000, however Artesia Consulting also compared shower duration with information from a study completed by the Market Transformation Programme (MTP) which supports UK Government policy on sustainable products.

Artesia Consulting took into account the split of normal/power showers in the Thames Water area, retro-fitted and refurbished showers and concluded shower duration of 5.2 minutes with a corresponding average volume of 21.8 litres per person per day. The MTP study also has evidence to propose growth in shower duration which it suggested should inform the Company's longer term planning.

#### *Toilets*

Thames has revised its estimate of flush frequency from 4.1 flushes per person per day to 4.5 flushes per person per day. This is based upon a Thames specific study in 2002 and a comparison of data in water companies' dWRMPs. Artesia Consulting assessed the data and Thames Water's PCC model which accounts for the age (and therefore volume) of toilet cisterns. Artesia Consulting's assessment revised the flush volume for both measured and unmeasured properties with measured reducing slightly because the metered dataset is likely to contain a larger number of newer properties with lower volume cisterns.

The resulting revision gives a volume of 8.19 litres per flush (previously 7.73 litres).

#### *Internal tap use*

Thames has revised its estimate of internal tap use upwards by 16 litres per person per day. The Company's PCC model divides 'tap use' into 'hand dishes' and 'sundry use'. Artesia Consulting has analysed several datasets and concluded that the Company's components are approximately 16 litres per person per day lower than a previous Thames-specific study by WRc break down tap use into other categories such as drinking, cooking and

personal washing. The Company has therefore, on the advice of Artesia Consulting, merged its sundry use and hand dishes categories into “internal tap use” and updated its assumptions by adding 16 litres per person per day.

#### *Impact & opinion*

The impact on PCC of reassessing these three micro-components is:

- Shower duration and volume of water used – reduced contribution to PCC from 30% to 17%
- Toilets flush frequency and average water used per flush – increased contribution to PCC from 20% to 24%
- Internal tap use – increased contribution to PCC from 13% to 24%.

Our review of the three micro-components confirms that Thames was a relative outlier in all three when compared to other water companies. The information supporting the adjustments made confirms they have been undertaken by a recognised industry specialist and are valid. We note that Thames Water’s micro-components now sit more comfortably within industry ranges. This comparison has not previously been possible and is the result of companies’ dWRMPs being in the public domain.

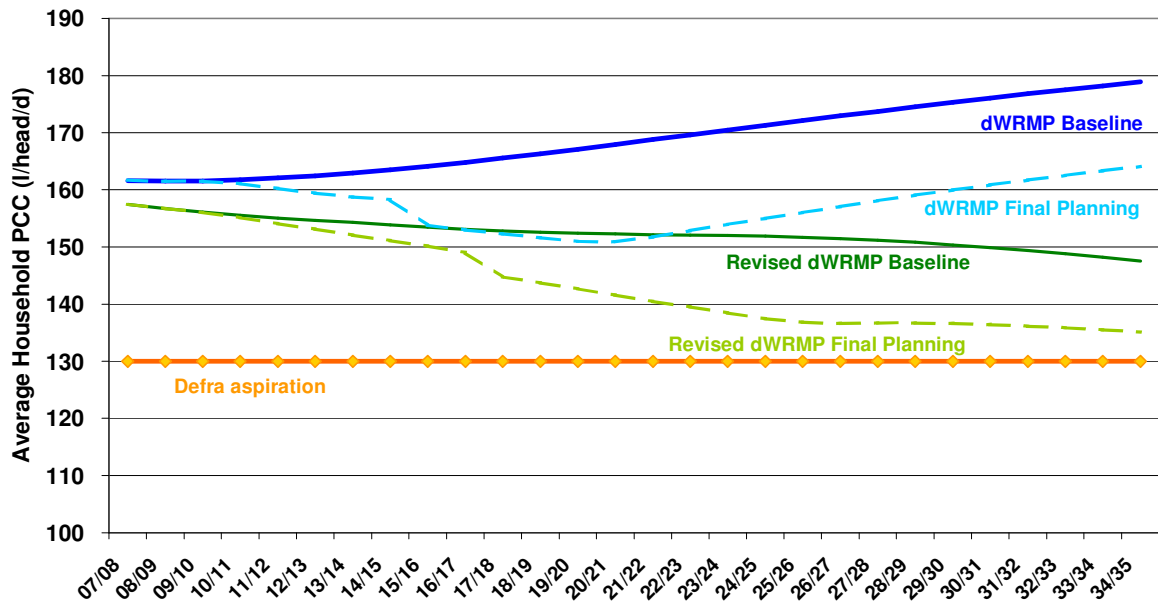
The impact during AMP5 of the revised micro-components is a decrease in demand of 43 Ml/d in London by 2014/15.

#### **4. PCC**

DEFRA has published its aspirations for declining PCC to reach 130 l/head/day by 2030. We discussed this with Thames Water during audit. The Company explained that it interprets it as an aspiration whereas responses to their public consultation appeared to suggest that a variety of stakeholders considered it incorrectly to be a water company target. Thames Water’s predictions show a declining PCC over time and we challenged whether it takes into account regional and cultural differences in water use because this could impact on PCC. The Company responded that whilst different cultures may use water in different ways in different parts of its supply area, this could be offset by other components which may have been over stated, for example shower use as discussed above. The Company has moved away from its customer survey regarding outdoor use which was undertaken for the dWRMP shortly after the summer 2007 floods and in the wake of earlier drought restrictions (60,000 questionnaires sent with 10,000 responses). Thames has made sensible revisions to its PCC forecast based on its analyses of study data.

Growth in demand in the dWRMP was primarily driven by the Company’s assumptions regarding shower use (power showers) at the time. These have been revised as discussed above. Together with other revisions in the micro-

component analysis and the Company’s significant revision to its metering strategy (revised to meter in London over 15 years, previously 10 years in dWRMP and DBP), there has been a significant reduction in forecast PCC post investment in the FBP in comparison to the DBP based on the revised dWRMP metering programme. The Company’s forecasts compared to DEFRA’s aspiration are shown in the comparison graph below.



**Figure B5.3 Comparison of Normal Year Average PCC vs Defra Aspiration**

The Company has undertaken detailed analysis using revised information which is supported by detailed studies. The revised profile for PCC appears sensible based on detailed information. We note the downward revision to be common with other companies in the region.

**5. Water use in new-build properties**

Part G of the Water Regulations introduces a water efficiency standard for new homes of no more than 125 litres per person per day when assessed using the specified water calculator. For the DBP, Thames assessed new properties using 125 l/h/d however the PCC model applied a year on year growth through AMP5 for subsequent new properties.

The Company has made a sensible revision to this profile to introduce a transition from the current PCC in new properties (143 l/h/d) to DEFRA’s aspiration of 125 l/h/d for new properties. The transition allows for the delivery and implementation of Part G. Thames has profiled the PCC for new properties as set out in the table below.

Period	PCC (l/h/d)	Comment
AMP4 to 31 March 2010	143	Current usage in new properties. This allows for any delays in delivery of Part G (March 2010)
AMP5	143 to 125	Linear decrease in PCC to allow time for Part G to be implemented and enforced
AMP6 onwards	125	New properties built to achieve 125 l/h/d over the remainder of the planning horizon

We confirmed that the PCC model accounts for all new properties as above which is a more robust estimate than that made in the DBP where water use was modelled to grow from 125 l/h/d across AMP5.

We challenged the Company when a new property is no longer considered as such because water use may increase once a property changes hands and is no longer occupied for the first time from new. The Company responded that it considers 5 years to be a reasonable period for a property to be considered 'new'. We agree that this is a sensible assessment and note that new properties are currently fitted with water efficient toilet cisterns which will continue in use when a property is no longer classified as 'new'.

The impact during AMP5 of the revised PCC profile for new properties is an increase in demand of 1 Ml/d by 2014/15. By the end of the planning horizon (2034/35), the current estimated impact is a reduction of 82 Ml/d.

## 6. Target Headroom – 'Bounce back'

During the drought of 2006/07 water use restrictions were introduced in the Thames Water area. The Company reports that in the years following, there has been "dull, wet weather" and a significant decline in demand. Despite monthly modelling using weather-related demand models, it has not been possible to conclude whether the continued low demands since the drought restrictions are purely due to the extended period of dull weather or whether this actually represents a longer-term step change in water usage behaviour. It is likely that until we encounter a dry summer or a short period of hot weather we will not be able to see the likely longer-term trend.

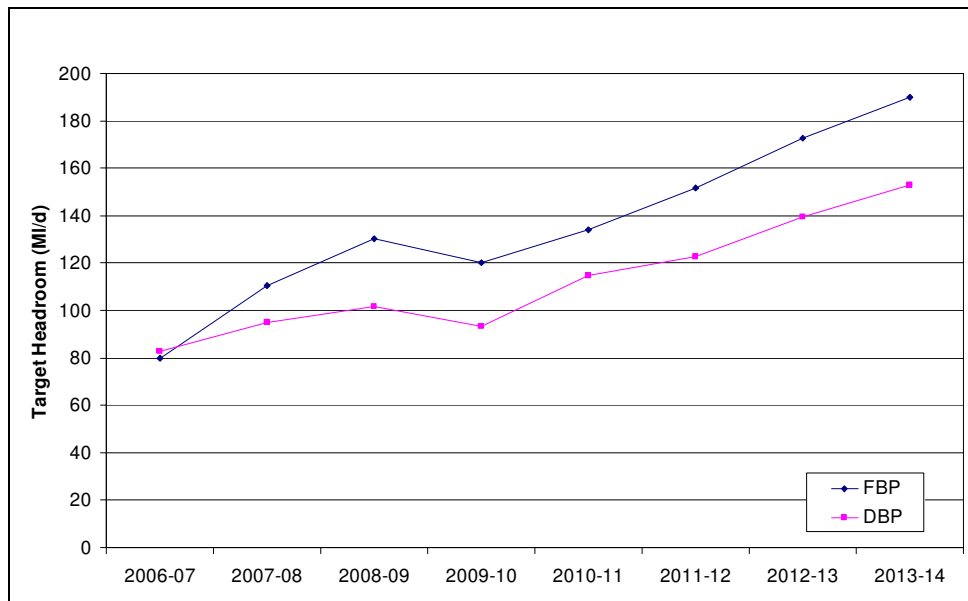
In the dWRMP and DBP the Company did not include this decline in the baseline PCC estimates, reporting on the assumption that demand will bounce back once warmer weather returned. For the FBP, we note that the Company has now included the decline, resulting in a step change reduction in the demand forecast over the entire planning period in London of approximately 40 Ml/d when compared to the dWRMP. There is minimal impact to the demand in the Thames Valley WRZs.

To compensate for this risk, an extra factor of uncertainty has been added to Target Headroom to allow for the possibility of bounceback towards the previous trend in demand in the original dWRMP forecast. The Company reports that such dips in demand following drought or prolonged dull and wet weather have occurred in the past and have been followed by a subsequent 'bounce back' to the underlying longer-term trend.

During our dWRMP and DBP audits we noted that the Company had included two time limited abstraction licences in its target headroom calculations in London (Bexley and Deptford) contrary to the EA Guidelines. The Company considers these licences to be particularly sensitive and at risk over the planning period. We note that the Company has removed these licences from the headroom analysis for the FBP.

The Company has made no changes to the risk level chosen over the planning period from the DBP and these remain consistent with the majority of other companies.

Figure B5.4 below shows a comparison of the target headroom included in the DBP with that in the FBP. This indicates an increase of 29% over that used in the DBP for the start of AMP5. We queried the Company as to the changes to target headroom and its response was that inclusion of bounce back in the headroom is the primary reason for the change, however, all parameters were reviewed given the changes in the demand forecast and the demand management/resource development programme.



**Figure B5.4 Target Headroom comparison – FBP and DBP**

We are satisfied with the Company's approach to accounting for the risk of 'bounce back' within target headroom rather than the baseline demand forecasts however we propose that if the significant decline in demand is maintained this is removed.

## 7. Demand management and confidence of achieving the outputs in AMP5 for London

The Company had planned significant demand management activity: water efficiency measures, leakage reduction and metering for all WRZs, particularly in London and SWOX to restore the SDB within the DBP. These have been significantly scaled back in response to reductions in demand.

### London WRZ

In the FBP, the Company outlines the reductions made to the final planning solution as shown. The reduction in savings associated is discussed below. For the FBP, within the London WRZ, the Company's programme appraisal process found demand management activity to be the optimum least cost solution over AMP5 and AMP6 and therefore reduction of the supply demand deficit is planned to be entirely based on demand management.

Components (cumulative contribution in MI/d)		End of AMP 5	End of AMP 6	End of AMP 7	End of AMP 8	End of AMP 9
Leakage	Revised	73	154	170	174	177
	Original	115	157	168	175	179
Metering, water efficiency and tariffs	Revised	19	70	104	101	94
	Original	44	127	133	127	122
Water Resources	Revised	0	0	22	200	200
	Original	8	8	275	275	275

### SWOX WRZ

The revised final programme for SWOX also reflects the reductions in demand and smaller deficit. Security of supply is now restored in 2012/13 compared to 2014/15 in the DBP.

Components (cumulative contribution in MI/d)		End of AMP 5	End of AMP 6	End of AMP 7	End of AMP 8	End of AMP 9
Leakage	Revised	4	5	7	8	9
	Original	5	4	4	4	4
Metering, water efficiency and tariffs	Revised	5	21	24	23	21
	Original	19	33	32	28	24
Water Resources	Revised	28	28	52	52	52
	Original	25	25	73	73	73

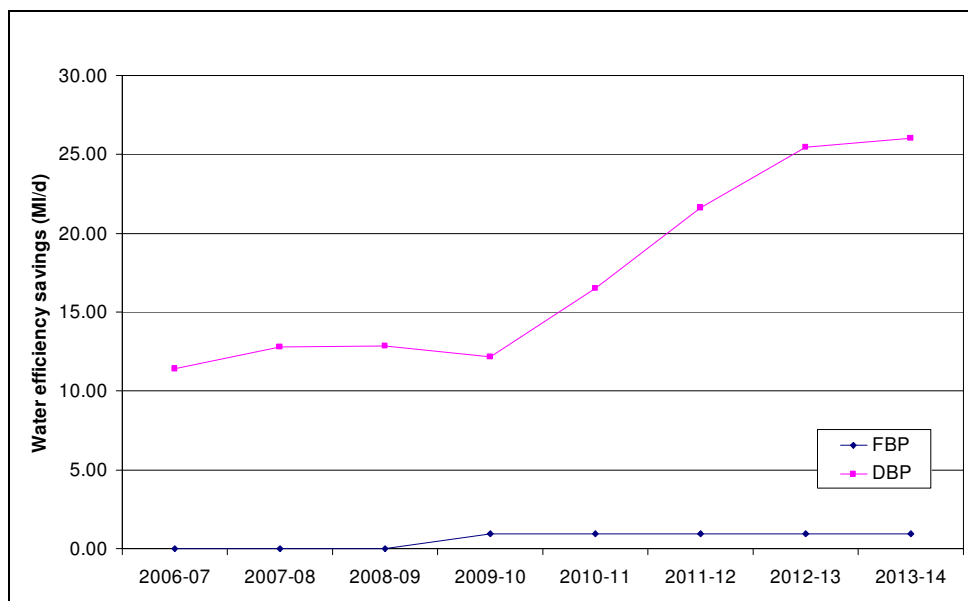
UTR Deferral

Based on demand reductions, the UTR has been deferred in the investment programme, particularly for AMP5. The reservoir is now no longer required for SWOX until 2024/25 (deferred from 2020/21) and London until 2026/27 (deferred from 2021/22).

The Company reports that the UTR will be completed and able to supply London in 2026/27. As was the case in the DBP/dWRMP, the UTR is able to meet a reduced yield during the preceding year, during the fill stage. This supply is sufficient to meet the requirements of the SWOZ WRZ. This leaves this Zone with a potential deficit in 2024/25. The Company advised that due to the size of this deficit, an additional scheme had not been included in the plan.

Water Efficiency

In comparing Line 19 of table B5.1 (see Figure B5.5 below), water efficiency deliverables appear significantly reduced and we queried the Company about this reduction.



**Figure B5.5 Total water savings achieved or assumed which result from the Company's water efficiency strategy – FBP and DBP**

The Company response was that the graph is misleading. Although it is a direct comparison of DBP and FBP entries, between submissions Ofwat has clarified the line commentary and the output is not directly comparable. Whilst the FBP shows only the AMP5 impact each year of the enhanced water efficiency programme not including baseline, the DBP shows the rolling savings of both the baseline and enhanced programmes.

The Company responded that compared to the draft a large proportion of the activity has become 'baseline' in response to Ofwat's water efficiency targets. Also, the programme is linked to the metering and leakage programmes through the integrated demand management approach.

#### Leakage Reduction

Thames has set out its AMP5 leakage control strategy in its submission. In summary the principal aspects that have been considered to formulate its strategy are:

- The success of the VMR mains replacement programme in AMP4
- High levels of recurrence in older parts of the network and the network's susceptibility to climatic temperature
- The diminishing returns from Active Leakage Control (find and fix) in delivering 'quality leaks'
- Customers' preferences and willingness to pay

We also consider that the Company's revised demand forecasts which are significantly different to the DBP forecasts are a key factor in the level of mains replacement activity that the Company has selected for AMP5.

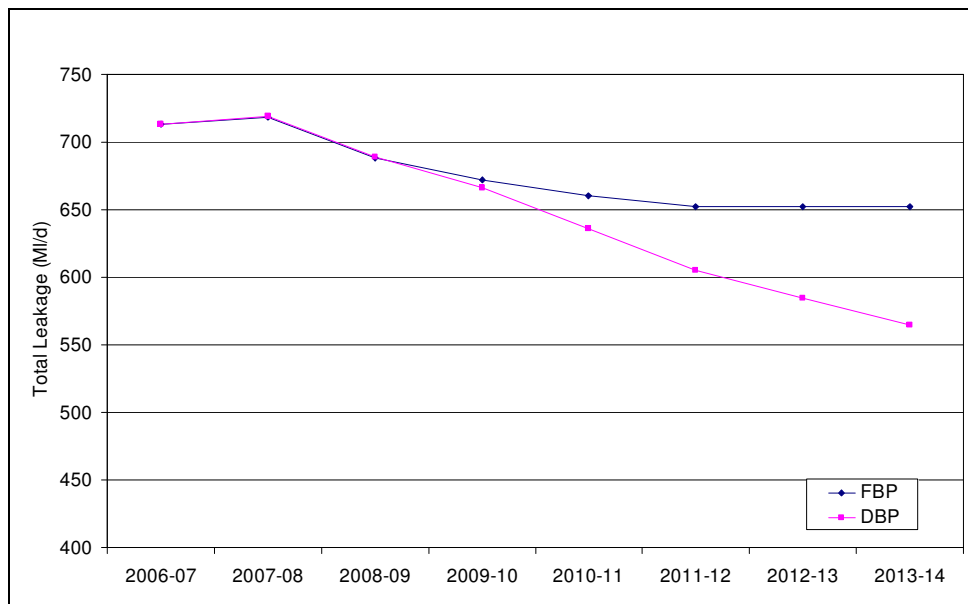
The Company's customer preference and willingness to pay studies indicate that customers consider leakage reduction as a high priority. Customers have a high awareness of Thames Water's VMR programme during AMP5 and perceive this to be a key aspect of reducing leakage.

Thames Water's leakage reduction strategy for AMP5 proposes continued mains replacement at 200 km per year (1,000 km in total in the revised WRMP, 400 km in the FBP, see climate change below) targeting DMAs with installation of meters and Leakfrogs to tackle high levels of customer side leakage. This is in addition to mains replacement proposed under Capital Maintenance to control burst numbers and to offset deterioration in leakage level. Additional active leakage control activity is proposed in London and SWOX. We note that it is not economic to increase the level of find and fix activity above the current normal year rates.

The need, and therefore the economic justification for leakage reduction is linked to assumptions on climate change. The Company has agreed with Ofwat to defer the decision on funding the final three years of its leakage reduction programme until the UKCP09 climate change scenarios are published. The Company's Final Business Plan targets therefore reflect only the two-year programme of leakage activity. The Company's longer term leakage strategy is to continue leakage reduction until 2025 and hold leakage levels steady at approximately 394 MI/d. This programme of reduction is not reflected in the FBP as this only includes the first two years of leakage investment.

The amount of VMR has been reduced by half from the DBP where 2,000 km of mains replacement was proposed as the most significant strand of the AMP5 leakage strategy.

The FBP leakage profile in the figure below is based on 400km of mains replacement included in the first two years of AMP5. The leakage profile proposed in the DBP included 2,000km of VMR profiled throughout AMP5. The two profiles are therefore not directly comparable.



**Figure B5.5 Total Leakage – FBP and DBP**

We note that during AMP4 another significant driver for leakage reduction was to close the shortfall in Security of Supply. In view of the economic downturn and clear evidence of lower demand forecast to be sustained, the supply/demand driver is no longer evident to justify high levels of mains replacement activity. We note that it will be challenging for Thames and Ofwat to fully gain customers’ understanding of the Company’s longer term aspirations for leakage reduction based on the business plan submission which has the final three years of investment on hold. Ofwat and Thames will need to adequately communicate the approach and the implications for the longer term strategy.

The supply/demand balance during AMP5 is highly reliant on demand management. In our opinion, this carries a greater risk to be achieved because of uncertainties in demand management activities, for example customers’ sustained uptake of water efficiency initiatives. When customers’ perception of leakage reduction is considered in isolation, there is a risk that Thames may be seen not to be adequately responding to customers’

preferences. We suggest that the leakage strategy is reconsidered as part of the year 2 review in relation to climate change.

## 8. Climate change

Inclusion of the impact of climate change was one of the most significant drivers for investment in the DBP, on both the supply and demand side. The Company used the UKCIP2002 scenarios as the basis for assessing these impacts. The latest information, UKCP2009 was due to be released prior to production of the FBP but has been delayed and is to be available in Spring 2009.

The 'Water Supply and Demand Policy', produced by Ofwat in November 2008, discusses the impacts of climate change on investment. The Policy states that it is important to make sure that there is a robust evidence base for significant investment decisions that companies cannot reverse and that will have a permanent impact on customers' bills. The climate change scenarios are now up to six years old and due to be superseded and therefore Ofwat has stated that where companies are proposing significant supply/demand investment driven by the impact of climate change, these scenarios cannot be used for justification.

Thames explained its revised approach to climate change impacts at our audits. In the FBP, the Company has only included investment costs and outputs for the first two years of the planning period (2010-12) for activities driven by climate change. For the remainder of the period, these activities have been removed, pending the release of UKCP2009.

The Company is proposing to submit an updated plan within the AMP5 period to justify the remainder of the investment, if the updated information supports it. The Company informed us at audits that it had discussed the approach with Ofwat early in 2009. The Policy states that if climate change assumptions have a material impact on a company's plan, it should set out how it proposes to build the required evidence. We consider that this is what the Company has done.

The deferred programme for London includes mains replacement, compulsory metering and enhanced ALC and for SWOX includes compulsory metering and resource development. The Company's plan is consistent with its revised WRMP outputs for the above for 2010-2012, diverging for the last three years as these funding for these activities is removed, pending the revised climate change inputs. The Company highlights inefficiencies and risk associated with complete removal of these activities from the programme and have requested a timely indication of details of an adapted "change mechanism" to fully fund the capex, opex and financing costs of any further necessary investment. We

concur with the Company that timely resolution of an appropriate approach to fund further investment is necessary to mitigate this risk.

### Summary of Audit & Review

The Company has cooperated with HMS through our auditing process and has provided commentary and data tables, albeit quite late in the reporting period. Despite this we have been able to fulfil our reporting obligations and there are no material issues outstanding. We highlighted in the DBP that a high level of detail was provided in these commentaries and that there could be scope for streamlining for the final SBP. Due to changes the Company has made this has not been carried out. We confirm the following:-

- The Company has used the latest guidance in preparation of the FBP
- The Company's plans will deliver the expected outcomes and that solutions are fit for purpose. We note however that the Company's plan includes significant uncertainty, particularly in light of the economic downturn. We are reassured that the plan will be re-assessed when the climate change estimates are revised.
- With the exception of leakage reduction, the Company's plans align to the customer Willingness to Pay surveys
- The Company has carried out a rigorous analysis of the components of the supply demand balance and has made appropriate adjustments to elements that better align it with the rest of the industry

We note that allowance for time limited licences has been removed from the target headroom within the FBP.

### Issues from DBP resolved in FBP

- *Required reductions from the Speen and West Berkshire sources should be confirmed with the Environment Agency and the correct funding route for the Axford sustainability reduction should be resolved in time for the FBP.*

The EA has confirmed reductions at Speen in the Kennet Valley WRZ, with an impact of 5 Ml/d on peak deployable output and 4 Ml/d on the average. The Company is also required to undertake implementation of a scheme to prevent potential damage to the Thatcham Reedbeds SSSI to offset the West Berkshire Groundwater Scheme. Funding for the Axford scheme remains within the FBP.

- *The demand savings associated with the Lower Thames Operating Agreement (LTOA) were revised for the dWRMP. The Company provided evidence that the Environment Agency has reviewed Thames' water use saving calculations and revised DO numbers and consider them to be reasonable. Full resolution of the LTOA should be a top priority in AMP5. Subsequent to audit, we understand the Agency has separately requested that the Lower Thames Control Diagram (LTCD) be reviewed and has agreed that this should form part of the wider LTOA review which is planned to continue into AMP5. Initial stages of the work have identified a number of key differences between the Agency's WARMS model and Thames Water's model. Until these are addressed, the Company does not intend use the Agency to verify the LTCD assumptions.*

We have carried out a separate review of the outstanding issues between Thames Water and the EA with respect to the LTOA and a separate report has been produced. Funding has been included within the FBP for further investigations into the LTOA.

- *The raw water accounting methodology remains unchanged from dWRMP and JR08. This was highlighted in JR07 and has not been resolved for the DBP. It is recommended that this is resolved for the final WRMP and SBP, following our JR07 suggestions.*

This is unchanged from the DBP, however we accept that it is not material to the plan.

## **Other comments**

### **Sustainability Reductions:**

We highlighted in our report on the Company's DBP that there were outstanding issues related to sustainability reductions. The Company has a Sustainability Reduction requirement at Axford, and the Environment Agency have confirmed the requirements for Speen and West Berkshire Groundwater Scheme since the DBP. Speen and West Berkshire are required under the Habitats Directive, whilst the Axford reduction is not.

The EA has confirmed that a sustainability reduction is required at Speen (Kennet Valley WRZ) since the DBP, requiring a reduction in of 4 MI/d (average) 5 MI/d (peak). The Company has therefore included funding for a scheme to achieve this reduction in the FBP. Due to time constraints, costing for this scheme (£x m) has not been reviewed as part of our audits, however we do not consider the solution itself to be inappropriate.

The EA has also confirmed that a scheme is required to protect the Thatcham Reedbeds from the potential impact of the WBGWS, rather than a sustainability reduction. This is because the WBGWS is a strategic drought

scheme and rarely utilised. Again, due to time constraints, costing (£x m) for this scheme has not been reviewed as part of our audits, however, we do not consider the solution itself to be inappropriate.

The Axford scheme has been examined in more detail since the DBP and the costs have increased as a consequence. Again, due to time constraints, costing (£x m) for this scheme has not been reviewed as part of our audits. However, we do not consider the solution itself to be inappropriate.

Ofwat Guidance requires that only those sustainability reductions required under the Habitats Directive will be funded through PR09. Sustainability reductions arising from other drivers are expected to be funded through the payment of compensation by the Environment Agency under the provisions of the Water Resources Act.

As reported in the DBP, the Company has concerns over the Environment Agency's mechanism for compensation for non-Habitats Directive reductions, based on its experience with the scheme for the River Darent. Therefore the Company has made no change and is again seeking funding through the FBP. We acknowledge that the Company's point is valid with respect to the River Darent scheme and do not challenge this.

#### **Lower Thames Operating Agreement (LTOA)**

As part of the FBP auditing, Ofwat requested an independent review of the impact on deployable output of the demand savings underpinning the LTOA and a greater understanding of the fitness for purpose of WARMS for investment planning for PR09.

To this end, we have carried out the following tasks:

- Establish and report the provenance of WARMS and the status of external validations by EA, Thames or third parties
- Audit and report on the validity of WARMS inputs in relation to operational data.
- Review and report on the resource configuration assumed in WARMS. This would effectively update the Atkins audit (July 2003) to satisfy ourselves that WARMS is properly configured to take account of the current system and available resources and checking that any substantial developments since the Atkins audit were properly reflected in the model configuration.
- Audit and report on consistency of WARMS output with the DO assumptions in FBP including scheme outputs, timing, climate change, metering, VMR and leakage.
- Establish to the extent possible whether the predictive performance of WARMS matches actual conditions during the 2006/07 drought.

- Comment on the extent and status of secondary checks or Quality Assurance regime applied to WARMS
- Comment on the robustness of the WARMS approach and discuss other company approaches.
- Provide a gap analysis of areas where the EA and Thames have not come to a satisfactory agreement between their different models (taking into account that the EA review is not complete) to provide a subjective view on materiality in terms of impact on AMP5 plans and comment on their relative materiality.
- Summarise conclusions and recommendations (if any) for further required work to improve the confidence that WARMS remains fit for purpose for planning and management in future use (AMP5 and beyond).

We note that whilst the EA has communicated to Thames Water in the letter on 13 February 2009 from Owen Turpin (Regional Environmental Planning Manager (Water Resources)) that it considers that the draft water resource management plan 2008 DO calculations are broadly within the expected range some issues remain outstanding between the EA and Thames Water with respect to water resources modelling. We would not expect the models to precisely align because in our opinion, the EA's model does appear to be as sophisticated as Thames' model. These differences are discussed in a gap analysis of areas where the EA and Thames have not come to a satisfactory agreement between their different models. We have provided a subjective view on materiality in terms of impact on AMP5 plans. We have appraised Thames of our findings and have a number of queries that require follow up with the EA. We will endeavour to issue our supplementary report within two weeks of our FBP submission.

Overall, based on the checks completed, analysis of the QA system and audit of the current configuration in the WARMS model, we are satisfied that the Company's WARMS model is fit for purpose for investment planning in PR09.

The findings of the associated audits are discussed in more detail in the Summary Report.

## **Conclusion**

The Company has undertaken significant and credible work since the DBP to inform the FBP in rapidly changing economic circumstances. The Company's preferred programme has been significantly revised in response to smaller deficits and heightened affordability issues due to change in economic climate. Demand management plays a considerable role in restoring the supply demand balance. The key changes from the DBP are:

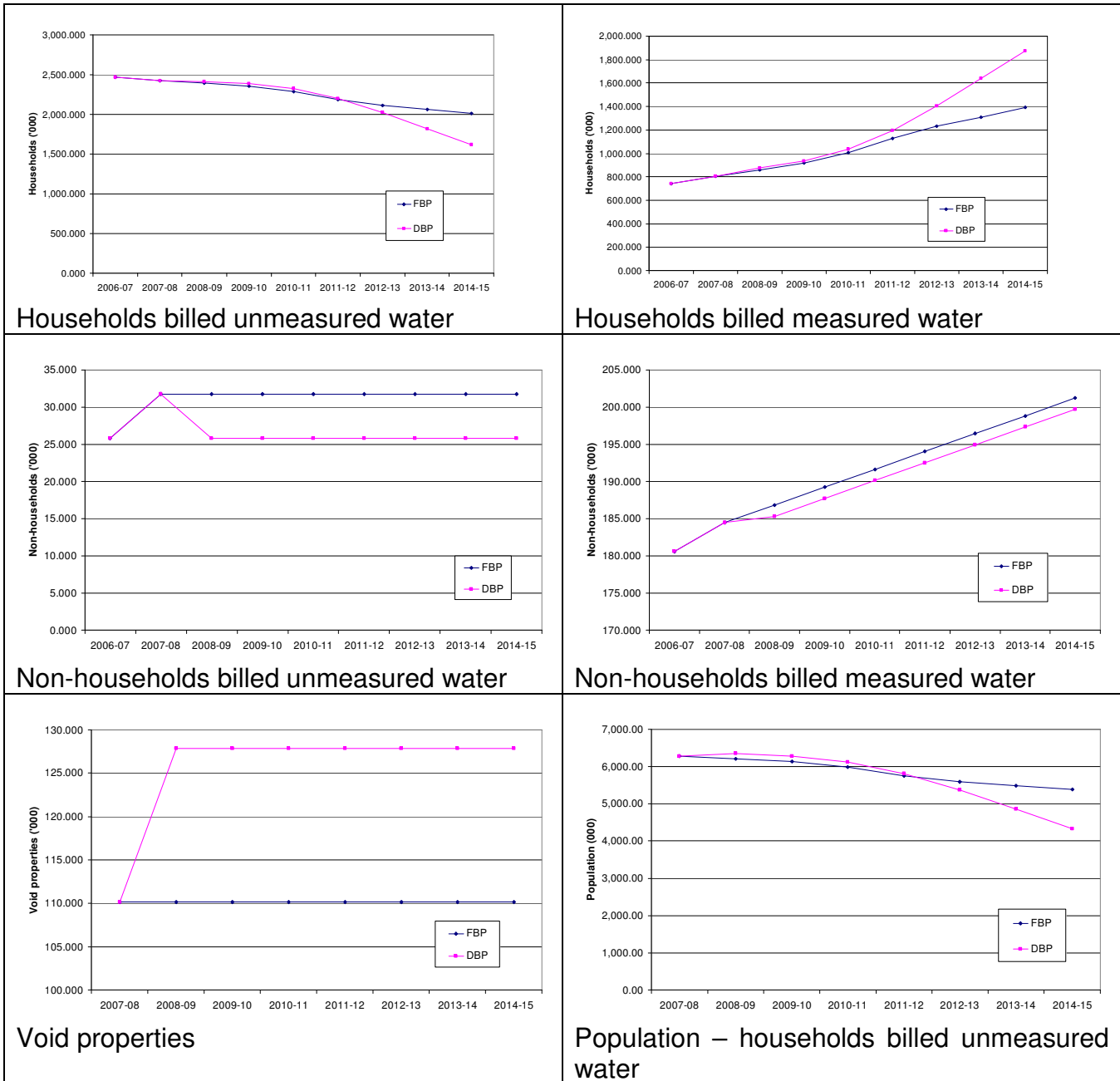
- Reduction in the AMP5 programme of mains replacement.
- Extension of the metering programme to a 15, rather than 10-year programme.
- Deferment of sophisticated tariffs in response to the revised metering programme
- Deferral of the resource development programme based on reduced deficits, in particular deferral of the UTR by around six years to 2026/27.

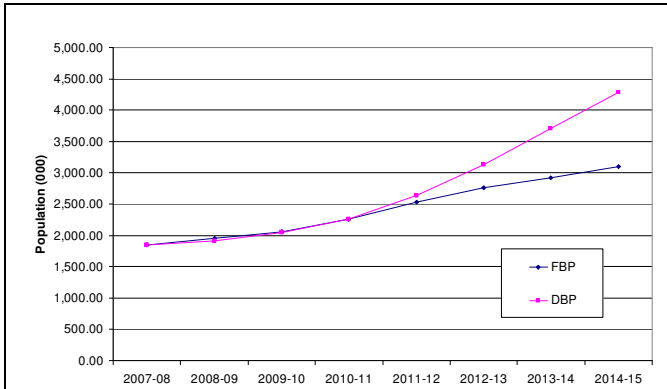
Overall, we are satisfied with the Company's Final Business Plan, although there is merit in revisiting aspects as part of the year 2 review to incorporate climate change.

**Date:** 15 April 2009  
**Prepared By:** HMS  
**Version:** Final

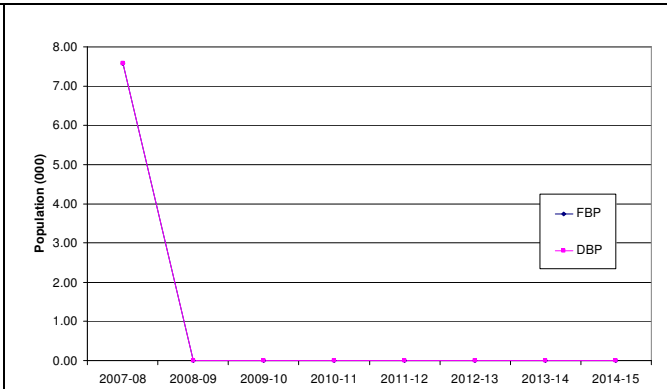
Appendix B5.A – Comparisons of data in the FBP with the DBP

We have compared the data presented in the FBP with that given in the DBP. Where there is a difference it has been discussed in the text above or in the Checklist.

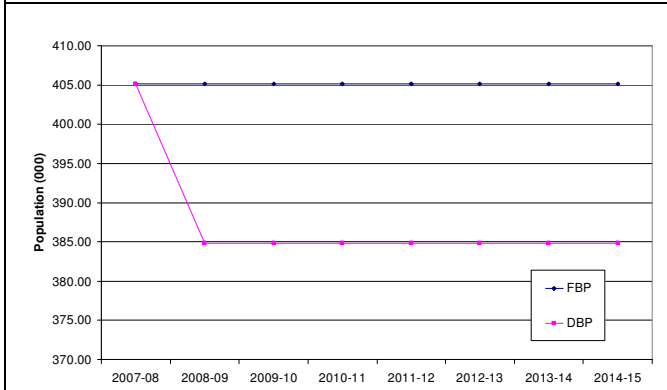




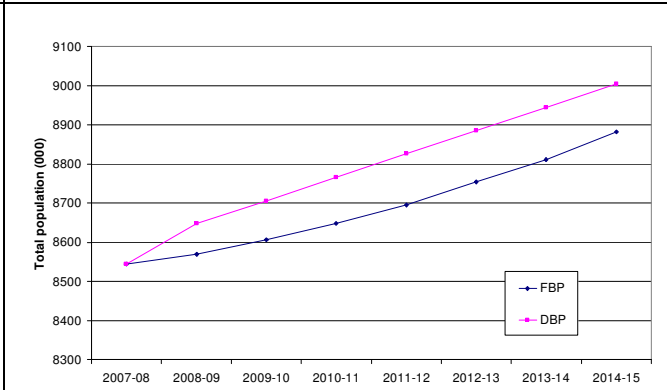
Population – households billed measured water



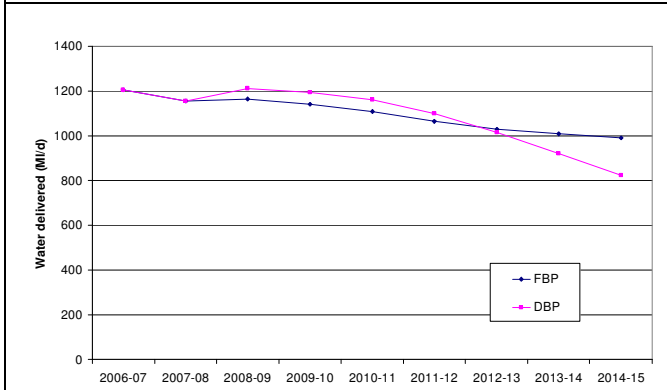
Population – non-households billed unmeasured water



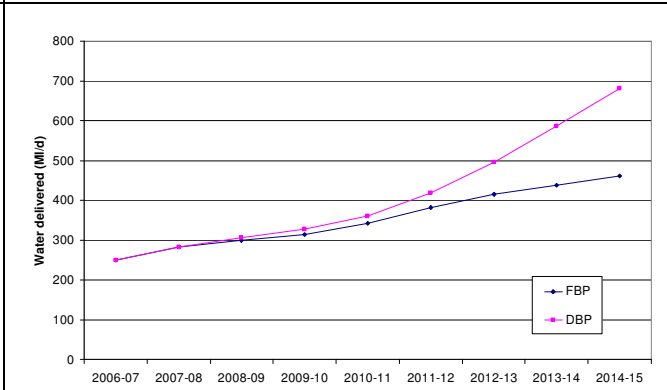
Population – non-households billed measured water



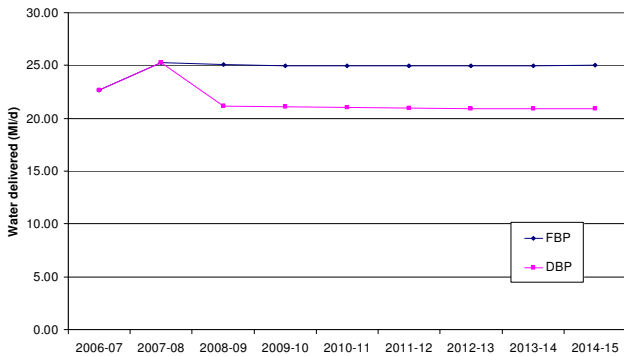
Population – total



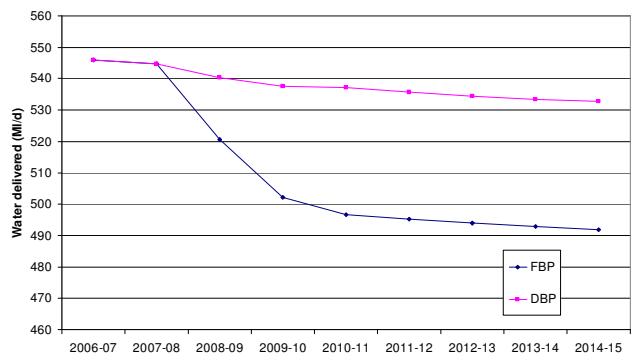
Billed unmeasured household – water delivered



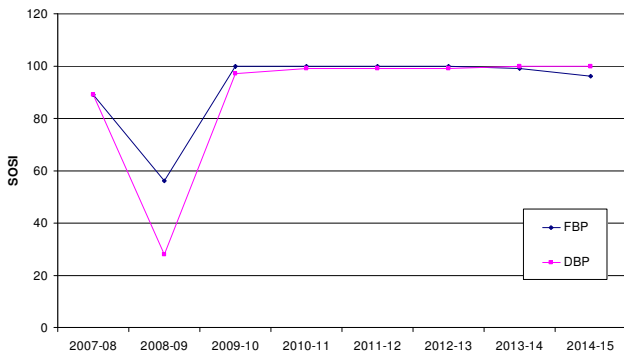
Billed measured household – water delivered



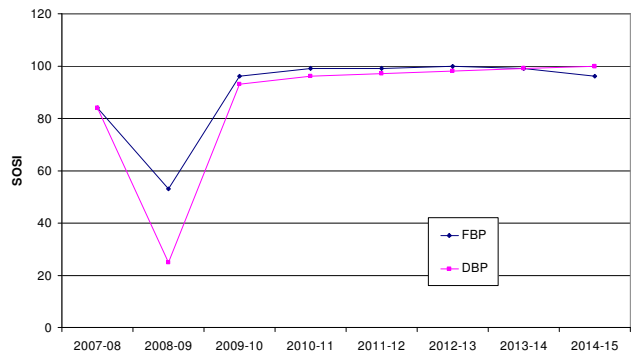
Billed unmeasured non-household – water delivered



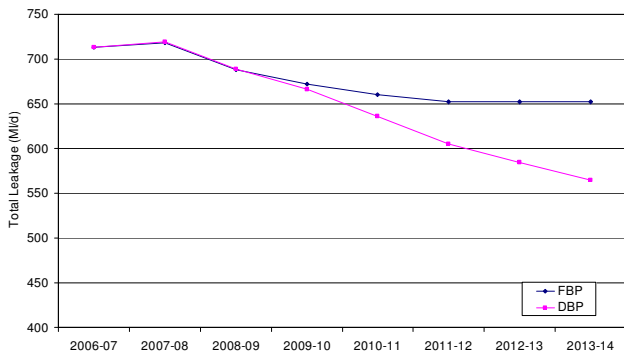
Billed measured non-household – water delivered



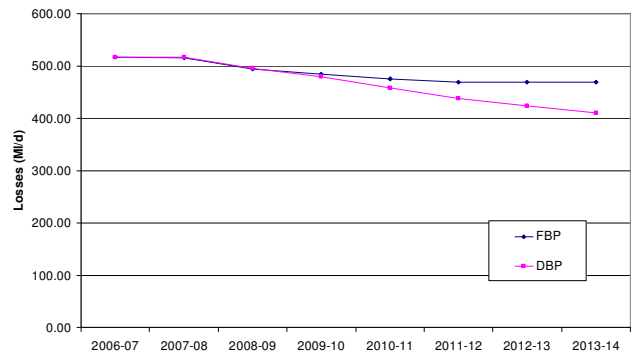
Security of supply index (dry year annual average - planned levels of service)



Security of supply index (critical period)



Total leakage



Distribution losses

