Part C4 – Supply / Demand Appraisal

Summary Report by REPORTER

Summary of Audit Findings & Reporter Opinion

We note that the supply/demand submission has changed significantly from the DBP, largely due to reductions in the forecast populations and properties in AMP5 resulting from the economic downturn. This has had a significant impact on the supply demand balance and hence planned program for AMP5.

We also note that the Company has put forward a number of Supply Demand Investigation Schemes, equivalent to an investment of over £'x'm (TEXT REDACTED], with outputs in the form of investigation/study reports and outline designs. These schemes are divided into four groupings: innovative technologies, risk management options, climate change and base deployable output, and metering trials.

The risk management schemes are put forward in the event that forecast demands and demand savings associated with water efficiency and metering in the AMP5 plan do not proceed as expected. These schemes represent £'x'm (15%) of the proposed expenditure. 'Innovative solutions' studies are primarily looking at longer term resource development options that need further investigation and design work to understand their potential future role £'x'm (62%). The 'climate change and DO studies' (£'x'm, 6%) and 'tariff trials' (£'x'm, 16%) are not linked to AMP5 risk and are key studies to help identify the potential impact of climate change on ground water and to understand customer demand response to different price signals, respectively.

Based on a preliminary assessment we are supportive in principle of Thames having a "Plan B", considering the importance of water resource schemes to restoring the security of supply in index in London and SWOX. It should be noted however that they should be considered on a scheme by scheme basis and require further review. We will endeavour to complete this within two weeks with a supplementary report.

We note that the schemes presented under 'Infrastructure Enhancement Strategy' are significantly different to those put forward under the DBP and that the cost has increased (TEXT REDACTED). The Company highlights that it was stated in the DBP that this area was very much still under review and that changes were to be expected. These changes result from reductions in demand and further development of the schemes included in the DBP. All schemes are included as growth rather than new development and all are considered non-requisitionable.

We support the Company's plan, in particular its commitment to metering,

leakage reduction and water efficiency. We note the deferral of resource development schemes as discussed in Part B5.

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 C4 (the Supply / Demand Appraisal), checking for completeness and consistency with the dWRMP, and that it provided supplementary information to Part B5.

An initial briefing on the Company's Part B5 and C4 information took place at the Company's Clearwater Court offices in Reading on Monday 9th March 2009. This was followed by audits on Friday 13th March and Friday 20th March.

Our approach to the audit of Part C4 has involved interviews, desktop study, and review of documentation, policies and data used to generate the table entries and line by line commentary for the Final Strategic Business Plan. We also reviewed arithmetical calculations, methods, assumptions and consistency with the draft Water Resources Management Plan and Draft Business Plan (DBP).

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. Where further detail is required it is included in this summary statement.

Summary of Thames Water's Proposals

The Company's demand forecast has been significantly reduced, primarily due to the impact of the economic downturn on the population and property forecasts. There are still deficits in the London and SWOX WRZs; however these are reduced which has implications for the planned investment. The FBP is heavily reliant on demand management, particularly in London. The Company is still proposing a significant (though reduced) ongoing programme of leakage reduction through mains replacement in London and an enhanced programme of water efficiency is still included, albeit reduced. The compulsory metering programme has been extended from a 10 to 15-year program in London and 10-year program in SWOX. In terms of resource development, the UTR has been deferred and is now not proposed to be delivered until 2026/27. The FBP also includes the delivery of a number of relatively small resource options in SWOX to restore the Supply Demand Balance. The reasons for the reduction and the subsequent impact on

demand forecasts and deficits are discussed in the summary report for Part B5.

The Company is already proceeding with the twin track approach to restoring the supply demand deficit with an extensive program of mains replacement and a reduction in leakage and therefore while the risks to delivery in AMP5 are well understood the consequence of not delivering forecast reductions, particularly for London are higher.

Updates to CBA approach

The Company has updated the CBA approach to better include the Integrated Demand Management approach and incorporate uncertainty. This is through an update to the metering input and inclusion of a leakage certainty model.

Cost-benefit modelling for metering inputs
The 'Water Supply and Demand Policy', produced by Ofwat in November 2008, discusses the economics of metering. Ofwat carried out a high-level assessment of selective metering and found that simple calculations suggested that, at the industry level, the gap between the quantifiable costs and benefits of near-universal metering could be quite small.

Based on this policy, for the FBP, the Company has used cost-benefit modelling to identify their metering strategy for input into the EBSD. A model originally produced by the Water Research council (WRc) and Himsley Meter Revenue Services was adapted for Thames' use by Himsley Meter Revenue Services. The Company's modelling tests a range of metering scenarios, varying the meter location, meter type and preferred approach to meter reading to achieve the most cost effective approach. Based on this approach, following this, the Company has evaluated the cost-benefit of then including Automatic Meter Reading (AMR) using the same modelling techniques.

The Company reports that compared to a baseline programme of metering activity relying solely on optants and new property growth, the overall cost-benefit ratio is improved by 19% with the inclusion of AMR. The selective metering programme, when combined with innovative tariffs is a least cost option. In addition, the environmental and social benefits of metering significantly outweigh the costs.

We discussed this method with Thames at audit and have reviewed documentation in Part C4, however we have not reviewed the modelling in detail. In principle, and based on the comprehensive listing of assumptions used, we are satisfied with the Company's approach.

Metering

The Company's compulsory metering strategy is a change from historical activity as previously meters were installed on change of occupier in designated areas in London and Thames Valley or if requested by the customer. The Company's mains replacement strategy continues the significant Victorian Mains Renewal and Distribution Mains Renewal schemes implemented in AMP4. The Company is well placed to continue this work.

Infrastructure Enhancement Strategy

The network enhancements include improvements required to transmission and network capacity and service reservoir storage across the supply area to ensure that the available water resources are able to meet forecast growth. As in the DBP, the Company has used strategic network models to identify the area where existing infrastructure needs to be enhanced in order to cope with new development and increased demand from existing customers. As with many other elements of the plan, we note significant differences between schemes put forward in the DBP to the FBP. Most significantly, we highlight that these schemes represent a different mix of schemes as well as a higher cost than included in the DBP (TEXT REDACTED)

Since the submission of the DBP, there have been significant changes to the type and make up of the schemes. The Company reports that this is due, in part, to the revision in the demand forecasts and economic downturn. The result of this is that the Company is putting forward significantly fewer network schemes – schemes that would have attracted developer funding. In the DBP there were seven network schemes and four storage schemes proposed. For the FBP the number of network schemes has been reduced in response to decreased demand moving the requirement for investment into future AMP periods. There are also now seven storage schemes, based on the revision to the Company's reservoir policy and one single feed zone to provide improved resilience and levels of service to the area supplied. The FBP is therefore more about sustaining existing levels of service and improving future resilience to existing customers.

Only five of the 11 schemes put forward in the DBP are carried through to the FBP, the remaining six being replaced by new schemes. The Company highlights that it is important to recognise that the make-up of schemes was under review in the DBP. The Company reports that further assessment has brought through 'new' schemes with a variety of drivers and that the movement in the demand forecast has removed the immediate need for others.

Of those being carried forward we note the overall increase in scheme costs as outlined in Table C4.1 below. The Company highlights that cost differences in those options are due to reviews of the schemes between draft and final business plans and highlight a further developed cost.

We particularly note the large increase in cost associated with works at the Bickley Reservoir and have queried the Company with respect to this increase. The Company response is that the solution put forward in the FBP is different to that presented in the DBP and results from the analysis of options for this site. The Company reports that at the DBP, several potential solutions for the site were identified and a minimal cost was included whilst identification of the best option continued. Since the DBP, subsequent work to confirm the optimum solution has identified further elements not previously included. The addition of these items, such as the construction of a new pumping station (as the existing one is not suitable to facilitate the upgrade) and a network cross connection, explains the cost increase. We are satisfied with the increase in this scheme based on a preliminary assessment.

Table C4.1: Changes to AMP5 Infrastructure Enhancement Projects – DBP to FBP

Solution Ref	Scheme	Type	WRZ	DBP Capex (£k)	FBP Capex (£k)	Diff (£k)
S393/2	Bicester ring main	Main	SWOX	X	X	X
S5937/2	Transfer capability from Kingwood Common	Main	SWOX	X	X	X
S7331/1	Bickley Reservoir – Storage Deficiency	Storage	SWOX	X	X	X
S7312/1	Barrow Hill Reservoir – Storage Deficiency	Storage	London	X	X	X
						X

The Reporter highlighted concern in the DBP over the significant cost, in particular for the main in Aylesbury (TEXT REDACTED) and Barrow Hill , based on predicted growth which may or may not occur. We note that while the Aylesbury scheme has been removed due to the reduced demand forecast, the Barrow Hill scheme (an amalgamation of two schemes from the DBP) remains. The Company explained that the Barrow Hill reservoir solution has been further developed since the DBP to confirm the engineering requirements and cost of construction. As for the Bickley Reservoir scheme, the Company reports that more detailed analysis has identified a number of construction and planning issues which have increased the costs for this solution. The original solution was worked from standard drawings and assumptions about the existing site and feasibility of construction. The final reservoir solution is a stand alone solution addressing both needs identified in the DBP for this area. We are satisfied with the Company's response.

As in the DBP, the Company has allocated 100% of costs to the growth category. The Company maintains that these schemes are strategic and that contributions from individual developers are very unlikely. Given the reductions in the demand forecast, the Company reports that proposed schemes are now driven by a variety of drivers such as current operational need, particularly for storage, or resilience.

There has not been sufficient time to audit these schemes in detail. Our assessment is based on the Company's report only and challenges following audit. We concur with the Company's opinion that individual schemes should be considered on their own merits and while we acknowledge that any work not required will be subject to logging down, we would suggest that further review is carried out. Overall, however, following a preliminary assessment of these schemes we are satisfied with the Company's approach.

Summary of Audit & Review

The Company has cooperated with HMS through our auditing process and has provided commentary and data tables.

At a later stage of FBP compilation, Thames provided details of a proposed programme valued at £'x'm known collectively as contingency schemes and comprising infrastructure enhancement (TEXT REDACTED) and innovation resource schemes. We have carried out a preliminary assessment and identified that further audit is required which could not closed within the FBP timetable.

The schemes are included in the event of technical, regulatory or promotional difficulties in implementing the defined water resource development schemes and constitute either a fallback or follow-on programme.

Given the importance of water resource schemes to restoring the security of supply index in London and SWOX, we are supportive in principle of Thames having a "Plan B". Due to time constraints we have arranged to complete our audits and issue a supplementary report within two weeks.

We can confirm that the Company has used the latest guidance in preparation of the FBP and we are satisfied with the Company's approach.

Other Comments

Supply Demand Investigation Schemes

The Company has highlighted that the preferred program is heavily reliant on demand management, particularly within London. The Company report, and we agree, that this may present a risk to restoring the supply demand balance as, largely, these reductions are beyond the Company's control and demand savings may fall short of intended savings.

The Company's response to this uncertainty has been production of a 'Plan B', both for within the 5 year planning cycle and for the longer-term. The Company view its 'Plan B' in a similar light to the alternative schemes for

London, developed when there was uncertainty around delivery of the Beckton Desalination Plant.

The Company has split these supply demand investigations into four categories:
(TEXT REDACTED)
- Innovative technologies ;
- Risk management options;
- Climate change and base deployable output;
- Metering trials.

The anticipated cost of these investigations is over £'x' million.

There has not been sufficient time to audit each of these schemes in detail and therefore we have only carried out a preliminary assessment. We have considered a selection of these investigation schemes, as discussed below and propose a detailed review, the results of which will be presented in a supplementary report.

Innovative technologies
These schemes include studies into re-use and aquifer storage and recovery and include development of potential options for the longer term. These schemes account for the majority of costs under supply demand investigations and are outlined in the table below.

Table C4.1: Innovative technologies and associated costs

Scheme name	Cost (£k)
Deephams potable re-use	'x'
Non-potable re-use trial	'x'
New development re-use desk study	'x'
Aquifer Storage and Recovery (ASR)	'x'

Deephams potable re-use (£'x' K)
An initial "research" phase of this project has already been funded in AMP4, which included development of a pilot plant and development of a program of public engagement. The Company reports that it has spent in the region of £'x'm on reuse to date, which includes the capital spend on the pilot plant (£'x'm) and the R&D spend on associated studies. Within AMP5, the project involves continuation of this pilot plant, carrying out trials of the various technologies, and research into environmental, health and public perception - completion of the R&D phase which accounts for £'x'm of the total. The remainder is for the design of the full plant and other full-scale scheme considerations.

The Company reports that stakeholder perception is a key issue in implementation of such a scheme, and the reporter agrees, and highlights that

these tasks are required to ensure that schemes could deliver over the longer term.

We highlight that based on a preliminary assessment we support the development of these schemes. It should be noted however that they should be considered on a scheme by scheme basis and may require further review.

Risk Management Options

These schemes include options that could quickly been brought on line if required in AMP5 should demand savings not materialise. These schemes account for £'x'million of the costs under supply demand investigations and are outlined in the table below.

Table C4.1: Innovative technologies and associated costs

Scheme name	Cost (£k)
Artificial Recharge - SLARS	x
Groundwater – East Croydon	x
Groundwater – Southwark	x
Groundwater – Goring Gap 4	x
Groundwater – Shalbourne	x
Groundwater – ELRED	x
Groundwater – Northern New River 1	x

For the 'risk management options' we queried the Company over the customer paying for their development based on uncertainty associated with the plan and that if schemes were needed within the AMP5 period they should be funded through the appropriate channels. We challenged the Company that if at the end of AMP5 demand has not materialised and the schemes are not required there will be a 0 Ml/d benefit attached to this cost (£'x'm). The Company responded that if it were to wait and see with respect to this risk, then the lead in times for the risk management schemes may be so long that they cannot be implemented in AMP5. The Company responded that there are precedents for this work and there are outputs that can be logged down if not delivered.

We also challenged the Company with respect to the EBSD modelling and the 'least cost plan'. The Company reports that the options put forward are considered the 'next best' options from an EBSD perspective and that three of the options are chosen by EBSD as the best 'bridging' solution in AMP7. The Company reports that it is in effect bringing forward this expenditure to help manage the acknowledged risk. The Company informed us that if the programme needed to change, Ofwat would be aware as it would need to inform it of the associated logging down and logging up cases.

Artificial Recharge, SLARS (£'x' K)

SLARS investigations have been included within the AMP3 and AMP4 programs to assess the technical viability of artificial recharge in South London. The Company reports that it has spent in the region of £'x'm on SLARS investigations in AMP4 and approximately £x m in AMP3, which led to the delivery of an operational borehole at Ladywell Fields (originally a SLARS trial site).

The Company reports that the AMP4 investigations have been completed and will conclude with data analysis to confirm the technical viability, including groundwater modelling and development of a provisional operating strategy and abstraction/recharge authorisation options.

The proposal for AMP5 includes further investigations to confirm the potential abstraction yield, and so confirm the deployable output benefit to the London WRZ at a cost of just under £'x' million.

We challenged the Company regarding the requirement for funding of this scheme unless it is needed to restore the supply demand balance. The Company's response was that it considers the case for continuing work on SLARS to be very strong for the following reasons:

- If delayed the lead in time would be affected and it may not be able to be delivered at the end of AMP5 if required;
- It is identified as the AMP7 bridging solution, thus the Company is bringing forward expenditure that would be required eventually anyway;
- An element of the scheme, Kidbrooke, was chosen by EBSD in the DBP and could be delivered ahead of the rest of the scheme;
- The scheme is discussed as an option with a potential regional benefit in the latest WRSE conclusions paper; and
- With a potential benefit of around 20 Ml/d, it would be a significant scheme if demand management doesn't deliver the expected savings. The other options in London would increase DO by <2 Ml/d each.

Based on the Company's response we concur that continuation of study and outline design work on this scheme is of considerable benefit.

We challenged the Company on the effect of 'shelving' the project until actually required. The Company's response was that these studies include all the elements required to get a scheme to a point that they could be available at relatively short notice. This goes beyond confirmation of DO benefit and would necessarily include outline design and further detailed costing work. We are satisfied with the Company's response.

We highlight that based on a preliminary assessment we support the development of these schemes. It should be noted however that they should be considered on a scheme by scheme basis and may require further review.

Base Deployable Output & Climate Change Investigations

The Company reports that to improve confidence in base DO and the impact of climate change on DO from groundwater sources. This element includes groundwater source output investigations, prioritised by lower confidence in Deployable Output.

Thames reports that work will involve test pumping to produce discharge-drawdown relationships for 32 groundwater sources would be assessed using this approach, and downhole geophysical logging to assess the presence of critical groundwater inflow zones that could constrain abstraction under low groundwater level conditions. We note that this work is in accordance with the UKWIR 2007 methodology and are satisfied with this element of the supply demand investigation schemes.

Tariff trials

The Company reports that its proposals with regard to tariff trials are unrelated to AMP5 risk. According to the Company, its proposed trial will be the largest in the industry and will help inform and confirm the tariff changes that are considered to be integral to long term plans. Thames reports that outputs will be shared with other companies and Regulators and that it sees this trial as a key component to improve the industry's understanding of tariff development and the impact on demand of different price signals, different supply demand drivers and different WRZs.

We challenged the Company on this expenditure and for information, the Company provided a more detailed breakdown of the tariff trial expenditure. We confirm that we are satisfied with this element of the supply demand investigation schemes.

Table C4.2: Task outline and associated costs for the Tariff trial.

Category	Requirement Component	Cost
Trial Planning	Evaluation and design of new tariff structures, the meter reading data required, including cost-reflectivity and modelling of potential incidence effects for inclusion in Principal Statement submission	x
	Customer selection costs, including modelling to ensure representative samples	
	Cost of data cleanse for trial customers	
	Costs of customer recruitment and communications programmes	
Systems, Business Process and Training	Costs of replacing Meter Reading System software including Meter Reader management system	x
	Interface between MRS and CIS-replacement software	
	Establish Temporary CIS Replacement software (could be MS Office Utilities, or off-the-shelf software) that can handle c.10,000 customers and their associated customer contacts.	
	Storage of trial data on long-term basis	

	Establish temporary billing system (could potentially utilise CBS Navision) to produce invoices and VAT statements based on intelligent tariffs e.g. rising block. System would need to handle c10,000 customers, (transactions totalling c.£ x m/year)	
	Create an extension to the main TWUL website which allows users to log in, view consumption, pay bills (?) and view trial progress. Trial progress should be made available to all through external TWUL website (PR)	
	Create new route on IVR phone system for customers on trials to contact specially trained support staff.	
	Create interface between temporary CIS replacement and existing debt recovery system	
	Establishing new customer service processes and training to deal with customer queries surrounding the new tariff structures. Also processes to ensure we capture all learning points and customer feedback on the tariffs being trialled.	
Analysis and Post-trial	Analysis and modelling of results for sharing with stakeholders and the industry as well as informing the position for the company to take in terms of full scale roll out of new-metered tariffs in AMP6.	
	Cost of migrating customer data into SAP once trial is over	x
	System integration – full design and appraisal of the necessary technology and systems integration to manage the new tariffs in AMP6	
		£ x m

ELL Calculations

We note that the ELL methodology is unchanged from the DBP, with the Company evaluating ELL using both the more simplistic marginal cost of water (MCW) approach, followed by the comprehensive least cost planning (LCP) approach, however there have been updates to the inputs to this modelling. The Company reports that the ELL has been updated to take into account the revised demand forecasts and updated cost-benefit of all feasible options.

In the DBP the AMP5 ELL was given in the range of 437 to 463 Ml/d (2000 to 1500km of mains replacement), with the SELL when including willingness to pay at around 437 Ml/d (2000km of MR). The ELL is now in the range of 460 to 483 Ml/d (1500 to 1000km of MR), reflecting the smaller supply demand deficit. The SELL was given as around 460 Ml/d (1500km of MR).

The preferred programme for London (in the revised dWRMP) includes 1000km of mains replacement in AMP5, which when including the impact of the full AMP5 metering programme, reduces leakage to 481 Ml/d in London. This programme was chosen despite a greater programme of mains replacement forming the SELL (1500km), as this is the most efficient solution for balancing supply and demand without significant surplus. This is summarised in Table C4.3 below.

Table C4.3: ELL comparison for the DBP and FBP.

	AMP5 ELL	AMP5 SELL
Draft Business Plan	437-463 Ml/d 2000 to 1500km MR	437 Ml/d 2000 km
Revised WRMP ELL analysis	460 to 483 Ml/d 1500km to 1000km MR	460 Ml/d 1500km
Revised WRMP preferred plan	483 Ml/d 1000km MR	

There has been an update to the marginal costs of resource development options in London and SWOX. The Company explained during the DBP that its costing process involved continuous development through to the FBP. Based on this development, the Company has reviewed and updated the costs for all London and SWOX options as a part of this process.

There is a reduced deficit in both London and SWOX related to reduced population and property forecasts in the economic downturn. This has also impacted the ELL result.

Importantly, the Company's modelling of leakage cost relationships has been enhanced since the draft SBP to better integrate the standard leakage cost curves and the leakage uncertainty modelling.

To allow the assessment of further leakage reduction against other supply and demand options, a suite of "leakage control programmes" has been produced for each resource zone which determine the relationship between costs and leakage levels for a range of "leakage control options", e.g. mains replacement, customer metering, pressure management and levels of find and fix, at a specified level of confidence of delivery. This is discussed further below.

APLE and APLERisk software for leakage modelling

The Company has updated its approach to the modelling of leakage cost relationships since the DBP to include uncertainty around delivery of demand savings within the Cost Benefit Analysis. The Company told us at audit that the basis for this inclusion is that the uncertainty around the delivered DO benefit from leakage works can be more appropriately analysed through the APLERisk model than through the standard headroom methodology.

The Company reports that although leakage uncertainty has been evaluated using the same methodology as other demand components, a number of factors warrant its separate treatment outside of the overall headroom methodology. These include:

- The scale of the leakage issue and the proposed leakage reductions requires that it is individually evaluated and progress is separately monitored to track delivery
- The magnitude of the uncertainty can be altered by revising the mix of leakage control options
- The risk of the leakage programme failing to deliver can be proactively managed by the company (unlike that of the customer demand management programme which mostly depends on the customer response)
- The huge uncertainty around the leakage reductions would distort the overall headroom calculation

The Leakage Uncertainty Modelling Approach employs Monte Carlo analysis to undertake probability-based assessments of uncertainties around the components of leakage following the same approach as that used for determining headroom. The output risk envelopes generated during the simulation allow evaluation of the level of risk and informed decisions on risk acceptability and management.

The Company uses APLE to determine a suite of "leakage control programmes" for each resource zone which determine the relationship between costs and leakage levels for a range of "leakage control options", e.g. mains replacement, customer metering, pressure management and levels of find and fix, at a specified level of confidence of delivery.

APLERisk is used to determine the leakage reduction level at 80% confidence for a given option and a given cost. This uses a Monte-Carlo analysis, sampling from distributions of different aspects of the program that can affect the leakage reduction volume, including base level, leakage flow rate and costs. We challenged the Company on how the minimum, maximum and shape of the distribution were determined and how representative a triangular distribution would be for some of the components. The Company responded that these were determined based on practical experience and where a more representative distribution could be used, such as for the leakage flow rate, it had been. We are satisfied with the Company's approach.

We concur with the Company that this process is in line with best practice recommendations from the Tripartite Study. We audited the new additions to the ELL process, however there was not time to audit the changes to the ELL calculation. This is related to extension to the Company's deadlines.

Economics of Metering

The Company's metering programme and strategy is changed from the DBP, similarly to other elements of the plan, influenced by:

- Reductions in forecast demand due to the economic downturn;
- Representations on the dWRMP;
- The CIS Baseline level of investment published by Ofwat after the DBP;
- Ofwat's 'Water Supply and Demand Policy', November 2008; and
- Changes to the inclusion of the impact of climate change.

The economics of metering has changed for the FBP, and the Company lists the following:

- Cost challenge – the Company has responded to an Ofwat challenge to reduce metering costs and has removed 16% of the cost from the metering investment programme
- Synergies –partnering up with mains replacement programmes.
- Cost benefit assessment – enhanced cost-benefit modelling to identify the most cost-effective method of metering.
- Learning – based on experience from metering trials in AMP4.

In the dWRMP, the Company's metering strategy involved a 10-year progressive and targeted programme, focusing on London and SWOX WRZs, the areas with a supply demand deficit. Due to the impact of economic downturn and reduction to the demand forecast, the Company has extended the duration of the metering profile by 5 years to a total of 15 years (AMP5 to AMP7) in London and to 10 years in SWOX. Reduction in the number of properties connected (households, water service) over AMP5 is shown through comparison of numbers in the DBP with FBP.

The Company highlights the reduced supply demand driver and affordability issues for customers' bills in the recession as the main reason for extension to the program. Whilst overall there is a reduction in the number of properties connected to meters in AMP5, there is also a change to the proportion of selective and optant meters in the program. Figures B5.5 and B5.6 show a comparison of selective and optant meters proposed in AMP5 for the FBP with that predicted in the DBP. These figures show a significant increase in the number of optants towards the end of AMP4, which continues through AMP5. This is related to affordability issues and that most customers opting for a meter reduce bills. The number of selective meters is slightly reduced towards the end of AMP4 and then significantly scaled back in AMP5, resulting from the decrease deficit in London and SWOX and hence driver for investment.

There has been an update to the analysis of metering costs and benefits as discussed earlier in this report.

Cost-benefit modelling for metering inputs
The 'Water Supply and Demand Policy', produced by Ofwat in November 2008, discusses the economics of metering. Ofwat carried out a high-level assessment of selective metering and found that simple calculations suggested that, at the industry level, the gap between the quantifiable costs and benefits of near-universal metering could be quite small.

Based on this policy, for the FBP, the Company has used cost-benefit modelling to identify their metering strategy for input into the EBSD. A model originally produced by the Water Research council (WRc) and Himsley Meter Revenue Services was adapted for Thames' use by Himsley Meter Revenue Services. The Company's modelling tests a range of metering scenarios, varying the meter location, meter type and preferred approach to meter reading to achieve the most cost effective approach. Based on this approach, following this, the Company has evaluated the cost-benefit of then including Automatic Meter Reading (AMR) using the same modelling techniques.

The Company reports that compared to a baseline programme of metering activity relying solely on optants and new property growth, the overall cost-benefit ratio is improved by 19% with the inclusion of AMR. The selective metering programme, when combined with innovative tariffs is a least cost option. In addition, the environmental and social benefits of metering significantly outweigh the costs.

We discussed this method with Thames at audit and have reviewed documentation in Chapter C4, however we have not reviewed the modelling in detail. In principle, and based on the comprehensive listing of assumptions used, we are satisfied with the Company's approach.

The Company demonstrates both that metering forms part of the least cost plan and that AMR is cost beneficial and we are satisfied with its approach.

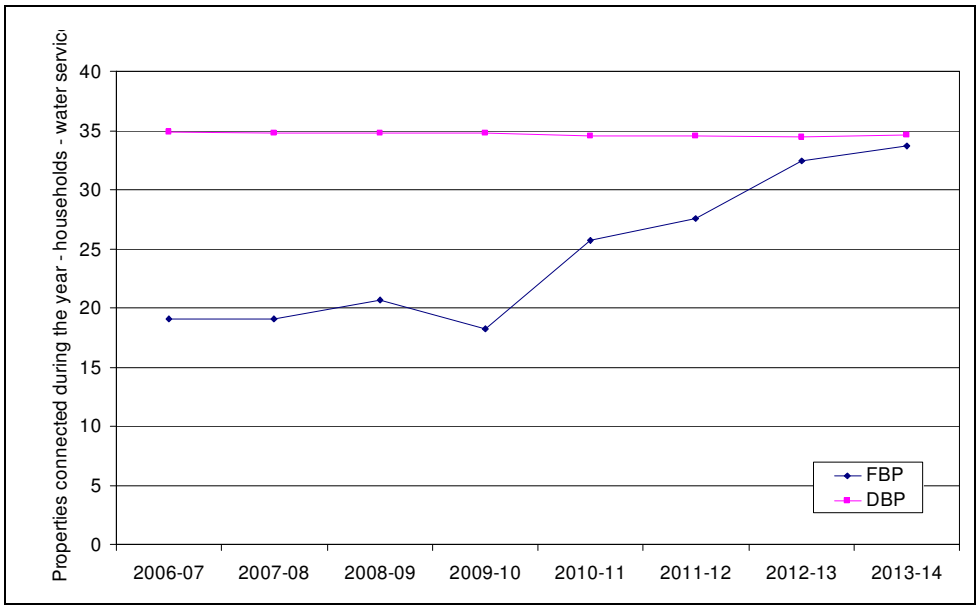


Figure B5.5 Properties connected during the year - water service – FBP and DBP

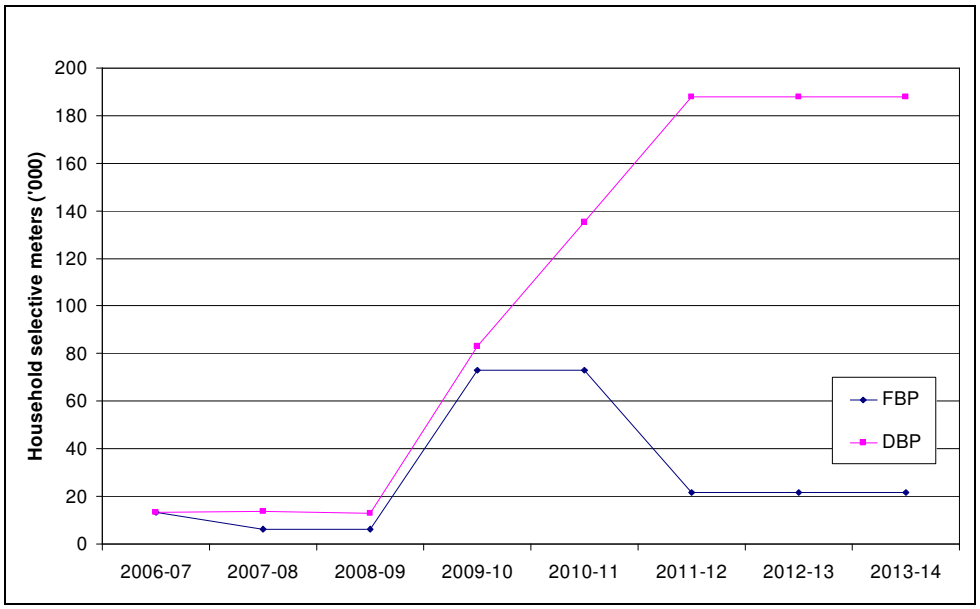


Figure B5.6 Properties connected via selective metering during the year - water service – FBP and DBP

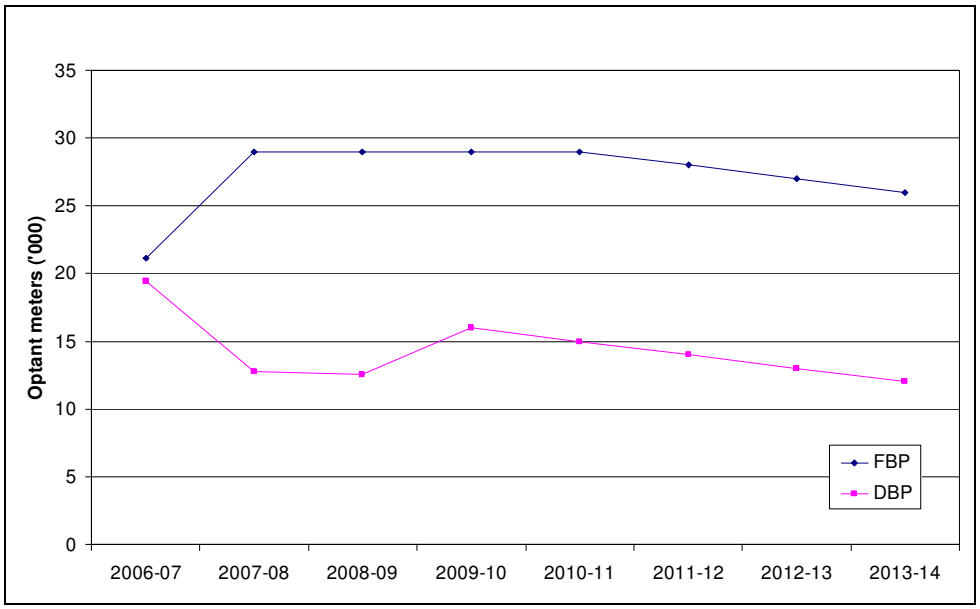


Figure B5.6 Properties connected via optant metering during the year - water service – FBP and DBP

As discussed in Part B5, the metering programme is influenced by the Company position on climate change. Reductions have also occurred due to the reduced supply demand deficits, as the investment activity alongside which metering can be delivered economically has been removed.

Conclusion

In conclusion, Thames has undertaken a significant amount of work for submission of its FBP, based on the representations made to the dWRMP and as a result of the economic downturn. We can confirm that the proposals set out in B5 are consistent with those developed in C4.

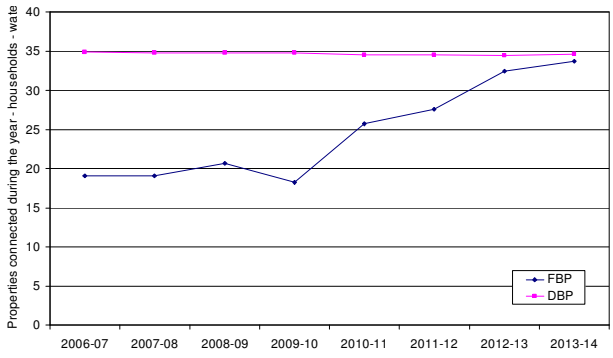
The supply/demand balance submission aligns to the Company's policies, its SDS and its PR09 Willingness to Pay surveys. We can also confirm that the Company's policies are consistent with the water resource planning activities of the Water Resources in the South East group.

We identified that the Company has taken into account continuation of its demand management policies, including leakage reduction and water efficiency in its proposal to balance supply and demand in AMP5. Thames' proposed program is now heavily reliant on demand management, particularly in London, with scheme development limited to some groundwater development in the SWOX WRZ.

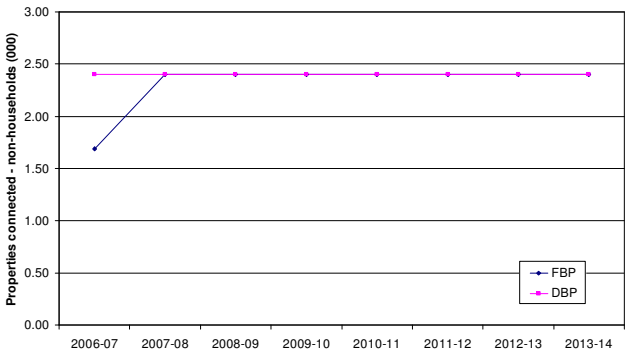
We have challenged a number of areas of the submission, as discussed in our report on Part B5.

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

Appendix C4.A – Comparisons of data in the FBP with the DBP

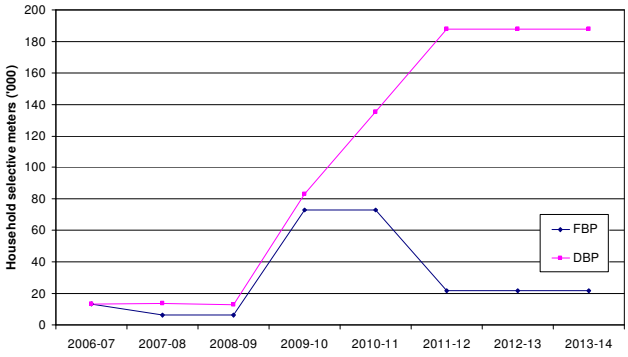


Properties connected during the year - households - water service

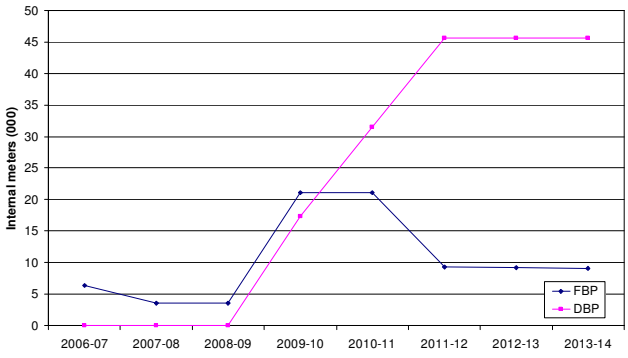


Properties connected during the year - non-households - water service

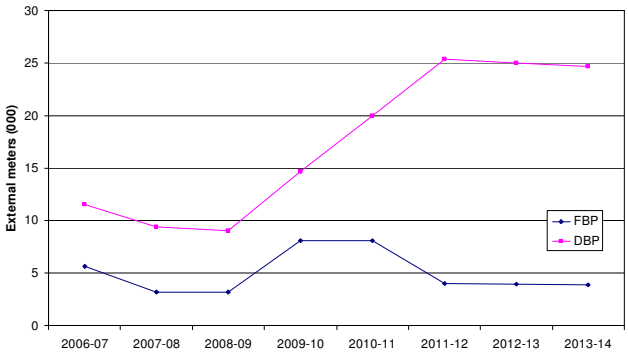
Metering programme - household optional meters - water service



Metering programme - household selective meters - water service

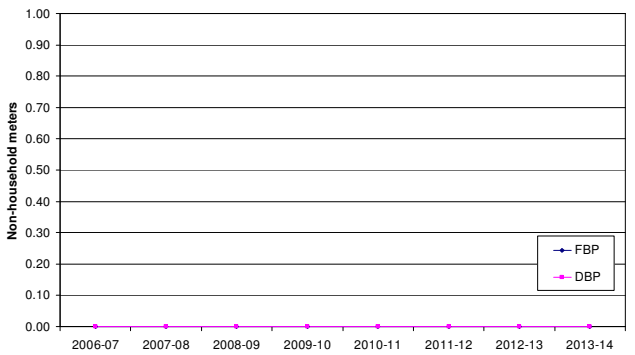


Metering programme - internal meters - water service



Metering programme - external meters - existing boundary box - water service

Metering programme - external meters - without boundary box - water service



Metering programme - meters non - household - water service