



**Water and sewerage service
unit costs and relative efficiency**

2005-06 report

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December 2006

OF WAT

The logo for OF WAT features the letters 'OF' and 'AT' in a bold, sans-serif font. The letter 'W' is enclosed within a solid black circle. A thick, textured black brushstroke underline runs beneath the 'W' and extends slightly to the left and right.

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Foreword

This report publishes our assessments of relative operating and capital maintenance efficiency for the first year of the five-year period (2005-10) covered by the price limits we set in December 2004. It also includes information on the 2005-06 unit costs of the water and sewerage companies in England and Wales.

We publish this information to allow customers, companies and investors to understand how companies are improving their relative operating and capital maintenance efficiency. We have already published and commented on company and industry level expenditure in our report on 'Financial performance and expenditure of the water companies in England and Wales' (September 2006). In that report we noted that although capital maintenance and operating expenditure increased in real terms in 2005-06, expenditure on capital maintenance was 14% lower than expected, while reported operating expenditure was 2% below price limit expectations.

In this report we look behind the expenditure figures to understand more about company efficiency. This is a complex process; for example, lower than expected capital maintenance activity and expenditure may affect this year's efficiency assessments. Our assessment is based on expenditure averaged over a number of years to even out fluctuations in capital maintenance expenditure. However, the picture on capital maintenance efficiency is likely to change over time as capital maintenance activity and expenditure responds to the increased financing in current price limits, and as companies address serviceability issues.

Operating efficiency assessments for 2005-06 are also more difficult than usual because reported operating expenditure no longer includes costs for recovering pension deficits. This is due to a new accounting standard for pensions (FRS 17). Because of this, we would generally expect lower reported expenditure. But at the same time, companies are dealing with volatile energy costs – which have risen overall since price limits were set, pushing expenditure upwards.


There are two elements to this report. The unit cost analysis shows how companies are investing at higher levels compared with the last price review period. The relative efficiency studies show companies maintaining a high level of performance for both operating and capital maintenance efficiency. Looking more closely, we still have only four companies graded C or below for water operating efficiency – but we have noticeably fewer A grades. We think this apparent decline relates to the improvement of the benchmark company, Yorkshire, relative to the rest rather than to any overall decline in performance in real terms. It is the kind of improvement that we had hoped to see when

we enhanced the incentives for the best companies at the last price review. And it will also encourage other companies to strive towards this higher level of performance.

For capital maintenance, we have used a six-year average for our assessment this year. We believe this provides the clearest indication at this time of the companies' emerging relative capital maintenance efficiency performance in the build up to the next price review. This year's assessments give greater weight to changes introduced following the adoption of the common framework for capital maintenance planning. Assessments in the future will provide a clearer picture, particularly as some companies have yet to increase activity levels in line with their plans.

We have continued our work on learning from the last price review. UK Water Industry Research (UKWIR) is managing a project for us and Water UK to review our approach to assessing efficiency. The consultants undertaking the work (Reckon) are due to provide their final report in January 2007. We will consider the findings of this review as we approach the 2009 price review.

On 16 November 2006, the Office of Fair Trading referred the merger of Mid Kent and South East to the Competition Commission. This will no doubt stimulate further debate around the role of comparative efficiency assessments in robust incentive regulation. We welcome this debate, as we look ahead to reviewing and updating our approach to the emerging challenges of the next price review.



Regina Finn
Chief Executive

Summary

This report analyses water and sewerage unit costs for 2005-06. We also provide our assessments of relative operating and capital maintenance efficiency for water and sewerage for 2005-06. We assess the relative efficiency of the companies to allow us to set price limits. This analysis is an integral part of the comparative competition regime, which contributes to lower bills for customers through demanding efficiency targets. We monitor and publish the companies' progress each year. We are continually reviewing and improving our approach to assessing relative efficiency and this report outlines the work undertaken and planned future developments.

Operating expenditure

- This reporting year (2005-06) is the first year of the five-year period (2005-10) covered by the price limits we set in 2004.
- Operating expenditure has increased by £151 million¹ (5%) after adjusting for exceptional and atypical costs compared with 2004-05. More than a third of the increase is because some companies have moved leakage control costs from capital maintenance to operating expenditure in line with our assumptions at the 2004 price review. The increase is also due to rising energy costs of around £67 million.
- At an industry level, operating expenditure in 2005-06 after adjusting for exceptional and atypical costs was £67 million¹ (2%) less than we assumed when we set price limits. However, some of this variance is due to a new accounting standard for pensions (FRS 17). Under this new standard, costs relating to the recovery of pension fund deficits are no longer reported as operating expenditure.

Unit costs

- The unit cost to customers comprises the unit costs of operations, capital maintenance and the return on capital.
- There is a wide variation in the unit costs between companies. This is due to differences in operating environments, the scale of expenditure needed to deal with new quality obligations, companies' inherited systems and assets, and differences in efficiency.

¹ The operating expenditure data published in this report is different to the data published in our 'Financial performance and expenditure of the water companies in England and Wales 2005-06 report' (September 2006). This is because the numbers presented in this report have been adjusted for atypical costs in line with our approach to assessing relative operating efficiency.

- The unit costs to customers at an industry level have increased in 2005-06 compared with the previous year for both the water and the sewerage service. This reflects the increases in price limits in 2005-06 necessary to support higher levels of investment.

Approach to efficiency

- We assess the relative efficiency of the water and sewerage companies to allow us to set price limits for this monopoly industry. In the absence of a competitive market we also use comparative competition to drive the companies to achieve improving levels of efficiency. We monitor and report on progress each year.
- We use companies' costs and operating conditions to assess their relative efficiency. High costs do not always indicate inefficiency as a high cost company may be operating in a particularly unfavourable environment. Similarly, low costs do not necessarily point to high efficiency, while rising costs do not automatically indicate that a company is becoming less efficient. For example, many companies face increasing costs for operating new treatment works to meet higher quality standards.
- We have based our water and sewerage assessments of relative efficiency for operating and capital maintenance on our econometric models and, in some cases, unit cost comparisons. We have made adjustments to our econometric assessments for atypical costs, company-specific special factors, pension costs and leakage cost allocation.
- We collect detailed information for use in our efficiency analysis in the June returns. We collect more detailed data for the sewerage service. This is because there are fewer sewerage companies, and therefore fewer independent data sets, than there are for the water service. Although this is not as good as having truly independent data, the collection of sub-company information does allow us to assess relative efficiency for the sewerage service.
- This year, we have assessed capital maintenance efficiency based on a six-year average expenditure (2000-01 to 2005-06). This approach removes the expenditure for 1998-99 and 1999-2000. This allows us to give a clearer picture of companies' efficiency based on expenditure that is more reflective of their current position.
- We rank companies in order of relative efficiency and divide them into five bands, where A is the most efficient. We band companies according to the percentage reductions they would need to make to their costs to achieve the efficiency of our chosen benchmark company for each service. The company that operates most efficiently is called the frontier company. The benchmark company is not always the company at the efficiency frontier. It needs to satisfy a number of criteria to make it suitable for comparison with the rest of the industry.

- Under the regulatory system, companies that are less efficient have strong incentives to cut costs while maintaining outputs. A company that improves its efficiency quickly can overtake its peers and leapfrog up the relative efficiency rankings.
- If a company outperforms our efficiency assumptions, it will keep the benefit of any incremental outperformance against our operating expenditure assumptions for five years. At the 2004 price review we introduced new enhanced incentives to encourage the very best companies to make further improvements in efficiency.

Water service relative efficiency assessment

- This year, we have used Yorkshire as the benchmark for relative operating efficiency. It is ranked second in our relative efficiency assessment behind Southern. Please see section 3.3 on page 32 for more information.
- The frontier company for capital maintenance in 2005-06 is Portsmouth. However, the company is too small to satisfy our benchmark criteria. Northumbrian remains the benchmark company for the third year in a row.
- Three companies (Yorkshire, Portsmouth and South Staffordshire) were assessed as band A for both operating and capital maintenance expenditure efficiency.

Sewerage service relative efficiency assessment

- The frontier and benchmark company for operating efficiency is Yorkshire.
- Wessex is the frontier and benchmark company for capital maintenance efficiency for the third year in succession.
- Wessex and Yorkshire both achieved band A status for operating and capital maintenance efficiency. This means that Yorkshire achieved band A status across all areas of our efficiency assessment.

Next steps

- During the last year we have reviewed the water resources and treatment operating expenditure model with the industry. We concluded that we should use a revised water resources and treatment model for 2005-06 and have changed one of the explanatory variables used to explain resources and treatment costs. This revised model is statistically more robust.

- We have continued to work with the industry in order to develop an improved model to explain sludge treatment and disposal operating costs. Over the last year we have had useful discussions, meetings and correspondence with companies on the development of the model. Companies have provided data for testing purposes and we will continue to work with the industry in the year ahead.
- In preparation for the 2009 price review we are working with the industry on a joint project on our approach to assessing efficiency in the water industry. The Steering Group includes representatives from Ofwat, UKWIR and the industry. In March 2006, the project team appointed consultants (Reckon) to review our approach to assessing efficiency. The project is due to be completed in January 2007. We will consider the findings of the report in making decisions on our approach to the 2009 price review.
- In the coming year we will review the capital maintenance econometric models. This will include a review of the data collected in the capital maintenance econometric return. We are planning to publish a discussion paper to explore the possibility of improving the models, and including issues raised by the joint project on our approach to assessing efficiency. We will also seek to involve companies and industry experts in considering the potential to improve the explanatory variables used in our modelling.

1. Trends in total expenditure and unit costs

This chapter includes our estimates of 2005-06 unit costs to customers. These costs are derived from data provided by each company. We set out the costs per cubic metre of water delivered and sewage collected, and per property billed. Water delivered is the estimated volume of water supplied to the boundary of each customer's property. It includes leakage from customers' supply pipes. Sewage collected is the estimated volume of water returned from customers' properties to the sewerage network. It is usually derived from companies' estimates of water delivered.

Comparisons of companies' unit costs are not in themselves a measure of relative efficiency. Costs can vary because of differences in operating conditions that are outside companies' control. Although the unit costs should be treated with some caution, they do provide a useful indication of the range in costs across companies and how costs have changed over time. They also allow us to make worthwhile comparisons with the water industries in other countries and with other industries.

We provide both a volume and per property measure of unit costs in order to present a balanced view for all companies. For example, a company that supplies a high proportion of its water to a small group of large customers will appear to have relatively high unit costs using the per property billed measure compared with the water delivered measure.

1.1 Trends in operating expenditure

Figure 1 shows actual trends in operating costs since privatisation in 1989, together with company forecasts and our determinations at each price review.

Following our first price review in 1994, companies outperformed our expectations about how efficient they could become over the period 1995-2000. Our 1994 allowance for operating expenditure included company-specific catch-up assumptions of between 0% and 2.5% a year, and a continuing efficiency of 1% a year.

Our 1999 price limit assumptions for operating expenditure included company-specific catch-up assumptions of between 0% and 3.5% a year, and a continuing efficiency of 1.4% a year. The industry continued to outperform our expectations during 2000-05, although to a lesser extent than in the previous price review period. The companies also consistently outperformed their own estimates.

Our price limit allowance for operating expenditure at the last price review in 2004 included company-specific catch-up assumptions of between 0% and 2.7% a year for the water service, with a continuing efficiency of 0.3% a year. The sewerage service

price limit allowance included company-specific catch-up assumptions of between 0% and 1.5%, with a continuing efficiency of 0.5% a year. The catch-up targets were based on the assumption that companies could catch up 60% of the gap between their performance and the benchmark company and were based on the results of our comparative efficiency modelling.

In 2005-06, the first year of the new price review period, operating expenditure increased by £151 million¹ (5%) after adjusting for exceptional and atypical costs compared with 2004-05. More than a third of this increase was the result of companies moving leakage control costs from capital to operating expenditure in line with our assumptions at the 2004 price review. Increasing energy costs of around £67 million are also a contributing factor.

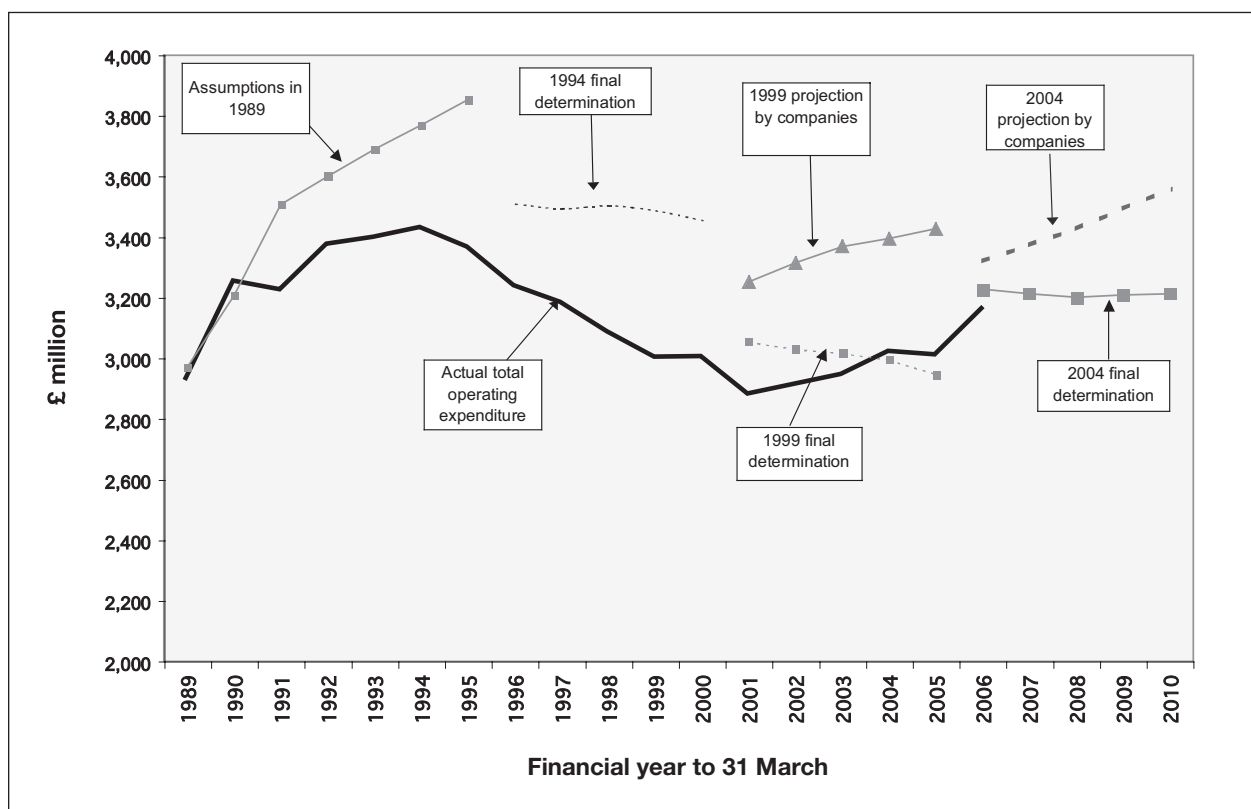
Although operating expenditure increased in 2005-06, after adjusting for exceptional and atypical costs, it was still £67 million¹ (2%) less than we assumed when we set price limits and the variance against companies' 2004 business plan projections was even more. It is too soon to assess whether the variance against our assumptions will continue for the remainder of this five-year review period (2005-10) as companies have highlighted continuing pressures on costs such as rising energy prices.

Some companies have explained that the difference compared to our price limit assumptions is partly due to early efficiencies. Other companies have explained that the difference is due to the introduction of a new accounting standard for pensions (FRS 17). Under this new standard, pension costs are now split between operating expenditure and interest.

Although companies have been required to change the way they account for pension costs, we are satisfied that companies' pension contributions are broadly in line with the assumptions we made when we set price limits in 2004. We have also made some adjustments to make sure that companies have been treated consistently when assessing relative operating efficiency. See chapter 2 (page 24) for more information on these adjustments.

¹ The operating expenditure data published in this report is different to the data published in our 'Financial performance and expenditure of the water companies in England and Wales 2005-06 report' (September 2006). This is because the numbers presented in this report have been adjusted for atypical costs in line with our approach to assessing relative operating efficiency.

Figure 1 Comparison of total water and sewerage operating costs (2005-06 prices)



1.2 Unit cost components

We can improve our understanding of cost trends by breaking costs down into:

- the cost of operations;
- capital maintenance charges; and
- the return on capital.

Cost of operations

This includes:

- employment costs;
- energy costs;
- costs of materials; and
- hired and contracted services.

It excludes the costs of third party services and exceptional costs, such as restructuring. See appendix 3 on page 51 for details.

Capital maintenance charges

Companies are required to maintain the operating capability of their asset systems to ensure continuity of service for current and future customers. We call this serviceability. For above-ground assets, companies apply a current cost depreciation charge based on the expected life of these assets. For underground assets, companies apply an infrastructure renewals charge. This reflects the expected costs, averaged over a suitable time period, of maintaining the serviceability to customers of these long-lived assets. The charges recorded in the accounts may differ from the costs of maintenance actually incurred in any year. This is why, when we assess relative capital maintenance efficiency, we use the actual costs recorded in the accounts averaged over a period of time.

Other factors that may affect the unit costs of capital maintenance include:

- the quantity of inherited assets;
- the age and performance of inherited assets;
- differences in accounting practices between companies; and
- previous management decisions on the balance between capital and operating expenditure.

Return on capital

This represents the remuneration to the providers of capital, both equity shareholders and lenders. It is the difference between income and costs (both operating costs and capital maintenance charges). In this report we have included atypical and exceptional costs, such as restructuring and pension holidays, in the return on capital to avoid distorting unit operating cost comparisons.

Differences in the return on capital reflect differences in the cost of capital and the capital base of each company. The return on capital is influenced by gains from increased efficiency and the timing of previous capital expenditure. The return may also reflect the requirement for internal funds to finance future investments.

1.3 Volumetric unit costs

Tables 1 and 2 on pages 15 and 16 show the breakdown of volumetric unit costs for the water and sewerage services for 2005-06, ranked in ascending order of cost to customers, on a pence per cubic metre (p/m³) basis.

Water service

- Unit costs to customers varied from 52 p/m³ of water delivered for Portsmouth to 149 p/m³ for Tendring Hundred.
- Unit costs of operation ranged from 26 p/m³ for Bournemouth & West Hampshire to 57 p/m³ for Tendring Hundred.
- Unit costs of capital maintenance ranged from 13 p/m³ for Portsmouth to 39 p/m³ for Dŵr Cymru.
- Unit costs of the return on capital ranged from 7 p/m³ for Portsmouth to 58 p/m³ for Tendring Hundred.

Tendring Hundred's high unit costs can be explained by the company's comparatively large capital base, resulting from its historically large capital programme to improve water quality. The high unit costs are also due to low demand by its customers and low customer supply pipe leakage. Together, these mean that the company delivers low volumes of water compared with other companies.

Sewerage service

- Unit costs to customers of sewage collected ranged from 62 p/m³ for Thames to 213 p/m³ for South West.
- Unit costs of operation ranged from 24 p/m³ for Thames to 66 p/m³ for South West.
- Unit costs of capital maintenance varied from 18 p/m³ for Thames to 67 p/m³ for South West.
- Unit costs of the return on capital ranged from 19 p/m³ for Thames to 80 p/m³ for South West.

The return on capital figure for South West reflects the high and accumulating costs of financing its large past and current quality programme.

Changes since 2000-01

Tables 3 and 4 on pages 16 and 17 show how industry volumetric unit costs have changed since 2000-01. Figures 2 and 3 on pages 17 and 18 illustrate these trends graphically.

Water unit costs of operation have remained broadly stable since 2000-01. The unit costs of operation for sewerage have increased over the last six years, which is due in part to the increased costs resulting from higher quality standards.

Both water and sewerage unit costs of capital maintenance have increased since 2000-01. For water, the unit costs were stable from 2002-03 to 2004-05, but increased in 2005-06 mainly due to additional investment to improve the serviceability of assets. Unit costs for sewerage increased steadily between 2000-01 and 2005-06.

For water, the unit costs of the return on capital increased in 2005-06. There has also been an increase in the sewerage unit costs of the return on capital, but this is not as significant. This is mainly due to an increase in turnover in 2005-06, which is a result of the higher price limits we set in December 2004.

The sum of these components represents the unit costs to customers. From 2000-01 to 2003-04 the unit costs remained generally stable for both water and sewerage. Unit costs for both water and sewerage services have since increased.

Table 1 Water delivered unit costs 2005-06

	Breakdown			
	Cost to customers	Cost of operations	Cost of capital maintenance	Return on capital
	(p/m ³)	(p/m ³)	(p/m ³)	(p/m ³)
Portsmouth	52	32	13	7
Bournemouth & W Hampshire	66	26	19	21
South Staffordshire	69	35	18	16
Cambridge	70	38	16	17
Three Valleys	72	32	20	21
Southern	73	30	31	12
Northumbrian	77	35	20	23
Dee Valley	79	38	26	15
Thames	84	40	23	21
Sutton & East Surrey	85	40	26	19
Mid Kent	85	37	24	24
Yorkshire	86	32	26	28
Bristol	89	41	27	20
Severn Trent	89	36	27	26
Anglian	91	34	26	31
South East	93	36	22	35
Wessex	94	34	29	31
United Utilities	95	35	29	32
South West	100	42	29	29
Dŵr Cymru	102	42	39	22
Folkestone & Dover	107	50	23	34
Tending Hundred	149	57	34	58
Industry (weighted) average	86	36	26	25
Key:	Below 70	Below 30	Below 20	Below 20
	70-79	30-34	20-24	20-24
	80-89	35-39	25-29	25-29
	90-99	40-45	30-34	30-34
	Above 99	Above 45	Above 34	Above 34

Note:

Numbers may not add due to rounding.

Table 2 Sewage collected unit costs 2005-06

	Breakdown			
	Cost to customers	Cost of operations	Cost of capital maintenance	Return on capital
	(p/m ³)	(p/m ³)	(p/m ³)	(p/m ³)
Thames	62	24	18	19
Severn Trent	96	36	27	33
Yorkshire	108	34	34	39
Northumbrian	121	42	37	43
Wessex	122	35	34	53
Dŵr Cymru	136	48	36	53
Southern	138	39	46	53
United Utilities	140	44	46	50
Anglian	141	52	49	40
South West	213	66	67	80
Industry (weighted) average	108	37	33	37
Key:	Below 100	Below 35	Below 30	Below 35
	100-119	35-39	30-34	35-44
	120-139	40-44	35-39	45-54
	140-159	45-49	40-44	55-64
	Above 159	Above 49	Above 44	Above 64

Note:

Numbers may not add due to rounding.

Table 3 Trends in water delivered unit costs 2000-01 to 2005-06

	2000-01 (p/m ³)	2001-02 (p/m ³)	2002-03 (p/m ³)	2003-04 (p/m ³)	2004-05 (p/m ³)	2005-06 (p/m ³)
Cost to customers	76	76	75	75	78	86
Cost of operations	35	34	34	34	33	36
Cost of capital maintenance	22	22	24	24	24	26
Return on capital	20	20	18	17	21	25
Water delivered (MI/d)	12,500	12,700	12,700	12,900	12,700	12,700

Notes:

All numbers are in 2005-06 prices using the Retail Price Index. Numbers may not add due to rounding.

Water delivered numbers have been rounded to the nearest 100 MI/day.

Table 4 Trends in sewage collected unit costs 2000-01 to 2005-06

	2000-01 (p/m ³)	2001-02 (p/m ³)	2002-03 (p/m ³)	2003-04 (p/m ³)	2004-05 (p/m ³)	2005-06 (p/m ³)
Cost to customers	97	98	98	97	102	108
Cost of operations	32	33	34	34	36	37
Cost of capital maintenance	29	30	31	29	32	33
Return on capital	36	35	33	34	34	37
Sewage collected (MI/d)	10,300	10,400	10,200	10,600	10,300	10,500

Notes:

All numbers are in 2005-06 prices using the Retail Price Index. Numbers may not add due to rounding. Sewage collected numbers have been rounded to the nearest 100 MI/day.

Figure 2 Trends in water delivered unit costs 2000-01 to 2005-06

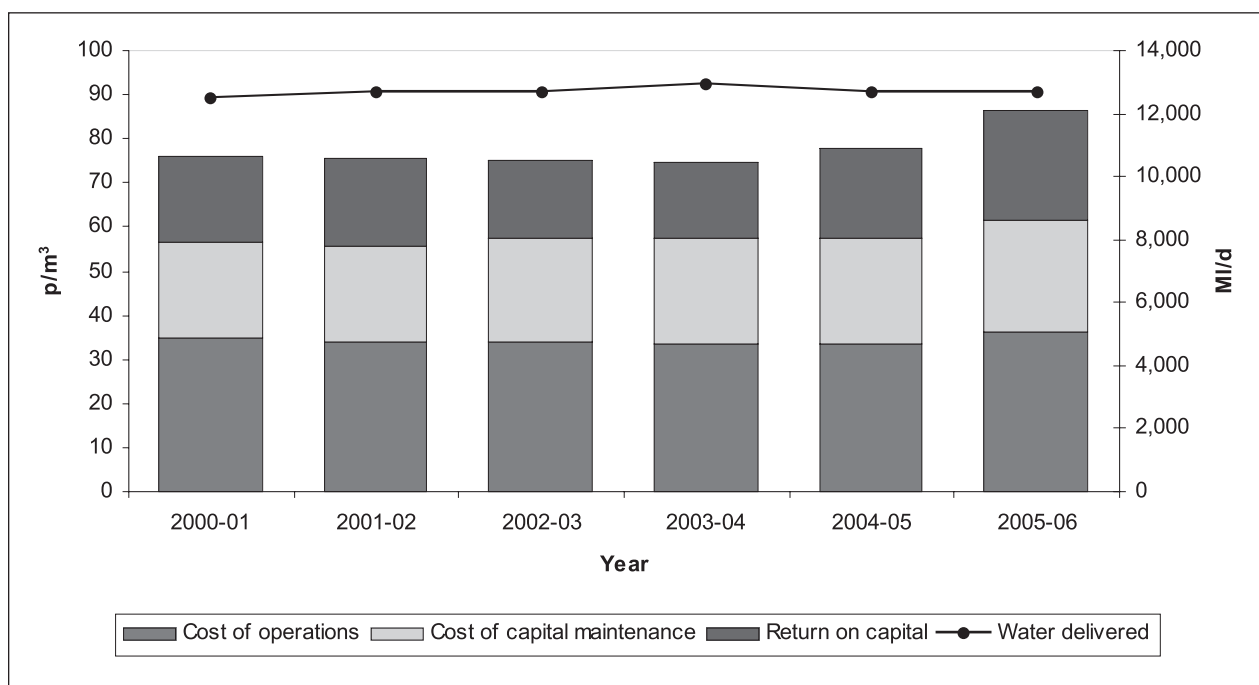
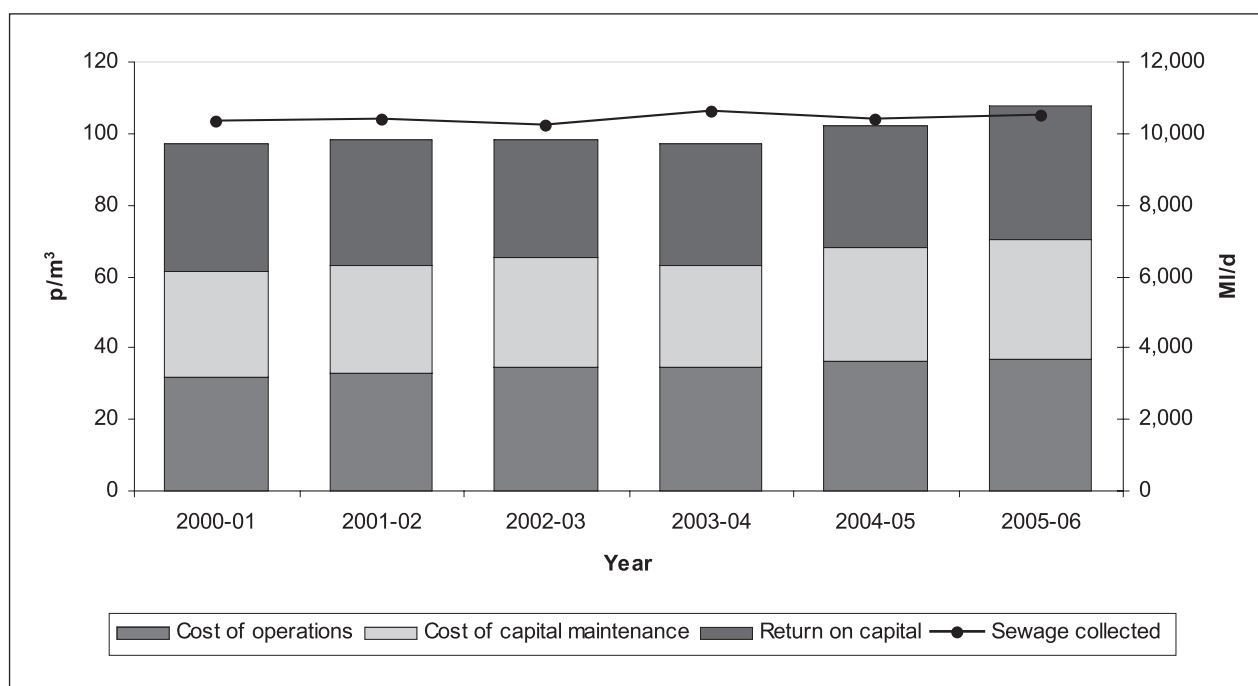


Figure 3 Trends in sewage collected unit costs 2000-01 to 2005-06



1.4 Unit costs per property billed

Tables 5 and 6 on pages 20 and 21 show the breakdown of unit costs for each household and non-household billed for 2005-06 on a pounds per property (£/property) basis.

Water service

- Unit costs to customers varied from £103 per property for Portsmouth to £214 per property for Folkestone & Dover.
- Unit costs of operation ranged from £55 per property for Southern to £100 per property for Folkestone & Dover.
- Unit costs of capital maintenance ranged from £26 per property for Portsmouth to £74 per property for Dŵr Cymru.
- Unit costs of the return on capital ranged from £14 per property for Portsmouth to £78 per property for Tendring Hundred.

Sewerage service

- Unit costs to customers ranged from £128 per property for Thames to £300 per property for South West.
- Unit costs of operation ranged from £50 per property for Thames to £93 per property for South West.
- Unit costs of capital maintenance ranged from £38 per property for Thames to £94 per property for South West.
- Unit costs of the return on capital ranged from £40 per property for Thames to £112 per property for South West.

Tables 7 and 8 on pages 22 and 23 show the changes in unit costs of operation per property billed between 2000-01, the first year of the last five-year price limit period (2000-05), and 2005-06, the first year of the current five-year period (2005-10). The changes in company rankings are also shown.

The water service unit costs per property have remained broadly stable at an industry level over this five-year period. Around half of the companies have reduced their water service unit costs of operation per property billed since 2000-01. Dŵr Cymru and Bournemouth & West Hampshire have both had reductions in costs of more than 15%. Only one company, Thames, has had an increase in unit costs of more than 15%.

Since 2000-01 the sewerage service unit costs per property have increased across the industry. Efficiency savings have been more than offset by the additional costs of new regulations requiring higher quality standards. Four companies have reported increases of more than 20% in sewerage unit costs. Only one company, Anglian, has reported a decrease in its sewerage service unit costs of operations per property billed.

Table 5 Water service unit costs per property billed 2005-06

	Breakdown			
	Cost to customers (£/property)	Cost of operations (£/property)	Cost of capital maintenance (£/property)	Return on capital (£/property)
Portsmouth	103	63	26	14
South Staffordshire	131	66	34	31
Southern	134	55	57	21
Cambridge	137	73	31	32
Dee Valley	156	76	51	29
Northumbrian	157	71	41	46
Severn Trent	162	65	50	47
Bristol	163	75	50	37
Yorkshire	164	61	50	53
Three Valleys	167	73	47	47
Anglian	169	64	48	57
Sutton & East Surrey	170	79	52	38
Bournemouth & W Hampshire	179	70	52	56
United Utilities	180	66	54	60
Mid Kent	182	78	52	52
South West	190	80	56	55
South East	192	75	46	72
Dŵr Cymru	194	79	74	41
Thames	195	92	54	49
Wessex	199	71	62	66
Tendring Hundred	201	76	46	78
Folkestone & Dover	214	100	46	67
Industry (weighted) average	172	72	51	49
Key:	Below 150	Below 65	Below 40	Below 30
	150-164	65-69	40-44	30-39
	165-179	70-74	45-49	40-49
	180-194	75-79	50-54	50-59
	Above 194	Above 79	Above 54	Above 59

Note:

Numbers may not add due to rounding.

Table 6 Sewerage service unit costs per property billed 2005-06

	Cost to customers (£/property)	Breakdown		
		Cost of operations (£/property)	Cost of capital maintenance (£/property)	Return on capital (£/property)
Thames	128	50	38	40
Severn Trent	161	60	46	55
Yorkshire	174	55	55	63
Northumbrian	193	66	59	68
Anglian	197	72	69	56
Wessex	206	59	58	89
Dŵr Cymru	220	77	58	86
Southern	222	63	74	84
United Utilities	232	73	76	83
South West	300	93	94	112
Industry (weighted) average	184	63	57	64
Key:	Below 180	Below 60	Below 45	Below 55
	180-199	60-69	45-54	55-64
	200-219	70-79	55-64	65-74
	220-239	80-89	65-74	75-84
	Above 239	Above 89	Above 74	Above 84

Note:

Numbers may not add due to rounding.

Table 7 Water service unit costs of operations per property billed 2000-01 and 2005-06

	2005-06	Rank	2000-01	Rank	Change
	£/property	1-22	£/property	1-22	%
Water and sewerage companies					
Anglian	64	4	73	10	-13
Dŵr Cymru	79	18	98	22	-20
Northumbrian	71	9	72	7	-1
Severn Trent	65	5	62	3	4
South West	80	20	73	9	9
Southern	55	1	53	1	5
Thames	92	21	77	15	20
United Utilities	66	7	64	5	3
Wessex	71	10	65	6	9
Yorkshire	61	2	63	4	-3
WaSC (weighted average)	71		70		2
Water only companies					
Bournemouth & W Hampshire	70	8	87	19	-19
Bristol	75	14	78	16	-3
Cambridge	73	12	73	8	1
Dee Valley	76	15	80	17	-5
Folkestone & Dover	100	22	97	21	3
Mid Kent	78	17	87	20	-11
Portsmouth	63	3	57	2	10
South East	75	13	75	13	-1
South Staffordshire	66	6	75	11	-12
Sutton & East Surrey	79	19	75	14	5
Tendring Hundred	76	16	80	18	-5
Three Valleys	73	11	75	12	-2
WoC (weighted) average	73		76		-4
Industry (weighted) average	72		71		1

Table 8 Sewerage service unit costs of operations per property billed 2000-01 and 2005-06

	2005-06	Rank	2000-01	Rank	Change
	£/property	1-10	£/property	1-10	%
Water and sewerage companies					
Anglian	72	7	75	9	-3
Dŵr Cymru	77	9	72	8	6
Northumbrian	66	6	56	5	18
Severn Trent	60	4	57	6	5
South West	93	10	76	10	24
Southern	63	5	51	3	24
Thames	50	1	45	1	12
United Utilities	73	8	57	7	27
Wessex	59	3	49	2	21
Yorkshire	55	2	53	4	5
Industry (weighted) average	63		56		12

2. General approach to relative efficiency

We assess the relative efficiency of the water and sewerage companies to allow us to set price limits for this monopoly industry. In the absence of a competitive market we also use comparative competition to drive the companies to achieve improving levels of efficiency. We monitor and publish the companies' progress each year. At each price review we use our assessments to derive efficiency factors to include in price limits and to identify companies qualifying for enhanced future incentives. In the meantime, the rewards for outperforming our assumptions on efficiency remain with the company. Customers will see the benefits of outperformance when we next set price limits.

We monitor operating and capital relative efficiencies separately. We further divide capital efficiency between capital enhancement and capital maintenance expenditure. We do this mainly for simplicity. It is important to recognise the interaction between operating and capital expenditure, and to appreciate that accounting policy can influence the outcome of individual areas of expenditure. Because of this interaction, we present operating and capital maintenance relative efficiency together in this report.

We have based the assessments of relative efficiency for operating and capital maintenance expenditure on our econometric models and unit cost comparisons. We have outlined the step-by-step approach we use to derive our econometric models, and the form and coefficients of these models in appendix 1 of the on-line version of this report.

We make adjustments to our econometric assessments for:

- atypically high or low costs;
- company-specific special factors;
- pension costs; and
- leakage cost allocation.

We then rank the companies in order of relative efficiency and divide them into five bands, where A is the most efficient. We band companies according to the percentage reductions they would require to costs in order to achieve the efficiency of our chosen benchmark company.

The benchmark company is not always the company at the efficiency frontier. It needs to satisfy a number of criteria, including size, to make it suitable for comparison with the rest of the industry. Our main criteria are summarised below.

- We must have no special concerns about the consistency of the data with our reporting requirements for the potential benchmark company.

- The potential benchmark company must have no special characteristics that are outside the control of the management and which significantly reduce costs relative to the industry norm for the particular area under review.
- The potential benchmark must represent a reasonable proportion of the industry. To date, our pragmatic threshold has been around 3% of the industry (by service turnover). A group of smaller companies that, when taken as a whole, are big enough to exceed the threshold, will be as suitable as one company with a turnover above 3%.
- For capital maintenance, a company must have stable or improving serviceability. This is so that we do not use a company whose capital maintenance practices have not been sufficient to deliver expected outputs.

We have also reduced the modelling residuals (the difference between actual costs and the costs predicted by the models) to take some account of possible errors in the data and in our statistical process. We have adjusted the water and sewerage residuals by 10% and 20% respectively. We put companies into relative efficiency bands after we made this adjustment.

2.1 Assessment of relative operating expenditure efficiency

We have based our assessment of relative efficiency for operating expenditure on our econometric models and, in some areas, unit cost comparisons.

Companies submit detailed data for use in the water and sewerage service operating efficiency assessments in their June returns. We collect more detailed data for the sewerage service including information for a number of areas within each company's region and data on individual large sewage treatment works and small sewage treatment works split by size band. Although this is not as good as having truly independent data, the collection of this sub-company information does allow us to assess relative efficiency for the sewerage service.

With one exception, we have used the models that were used for the 2004 price review, which have been updated using 2005-06 costs and operating data.

Water resources and treatment model

In last year's report, we highlighted our intention to review the water resources and treatment model. This followed the deterioration in the statistical robustness of the 2004-05 model because of changes in water treatment practices. Over the last year, we have reviewed several alternative models and sought views from the industry. We received a good response and some companies devoted a significant amount of time and effort carrying out analysis and investigating alternative models for which we are grateful.

Following our review, we concluded that we should revise the water resources and treatment model for 2005-06 by changing one of the explanatory variables used to explain resources and treatment costs. The previous model assumed that river water was generally more expensive to treat than water from reservoirs and groundwater sources. In the new model this is replaced by the assumption that groundwater sources are generally cheaper to treat. This is consistent with the view of the majority of water companies. Before confirming our approach for 2005-06 we ran the previous form of the model using 2005-06 data. This showed a further deterioration in the statistical performance of last year's model and confirmed our decision to use the revised model, which is statistically more robust.

Sludge treatment and disposal model

We have retained our unit cost approach for the sewage sludge treatment and disposal model for operating expenditure. However, we are working with the water and sewerage companies with the aim of developing an improved unit cost or econometric model to explain sludge treatment and disposal costs.

Over the last year we have had useful discussions, meetings and correspondence with companies on the development of the model. We have visited a number of companies to understand their approach to treating and disposing of sludge and to discuss the development of the model. These visits were extremely helpful, particularly in identifying the necessary data required for testing purposes. Companies have now provided data for testing purposes. We will continue to work closely with the industry to develop an improved model for sludge treatment and disposal costs in the year ahead.

Modelling adjustments

As with previous assessments, we have modelled companies' reported operating costs after excluding:

- third party costs;
- local authority rates;
- Environment Agency and British Waterways charges; and
- unusual one-off costs such as restructuring costs.

We make adjustments for leakage expenditure allocation to some companies' costs. We have not made as many adjustments in 2005-06 as in previous years as companies moved leakage control costs from capital maintenance to operating expenditure in line with our assumptions at the 2004 price review. We explain this further in chapter 3 (page 30).

We have also made adjustments for pensions for some companies. This has been necessary following the introduction of a new accounting standard for pensions,

FRS 17, which replaced SSAP 24. Because a small number of companies legitimately used the permitted multi-employer exemption from FRS 17 requirements on accounting for pension deficit recovery, we have considered how to create a level playing field for assessing relative efficiency. We reviewed the options, including trying to re-create the SSAP 24 position for all companies, or adjusting companies' costs as if they had all fully applied FRS 17. While the first option may preserve more incentives because it maintains the price limit efficiency challenge on all pension expenditure, we decided instead for this year to make adjustments for the small number of companies that had used the multi-employer exemption.

In addition, FRS 17 appears to introduce a distortion to reported operating expenditure where a company is on a pension holiday but has high future liabilities. We have made an adjustment to take account of this when assessing the relative efficiency of one company.

We will think more about the best way to preserve incentives and make sure that future price limits reflect the expenditure needs of the companies. We will resolve this issue in time for the next price review.

Model bandings

We assess companies within 5% of the benchmark company as band A. Subsequent bands are at 10% intervals from the bottom of band A. On average, a company in band B would need to reduce its modelled costs by up to 10% to achieve the efficiency of a company in band A. Band A also includes companies that are more efficient than the benchmark company, but are not suitable for use as the benchmark company. Our benchmark criteria is set out earlier in this chapter.

2.2 Assessment of relative capital maintenance expenditure efficiency

Our assessment of capital maintenance relative efficiency for 2005-06 follows a similar approach to the one we use for operating efficiency. During the 2004 price review we also used a complementary tool (the 'cost base'). We collected additional cost information for 2002-03 and 2003-04 from the companies for a wide range of standardised projects or units of work typical to the water industry (standard costs). The average of the cost base and econometric assessments then formed the capital maintenance relative efficiency assessment. We used this to set price limits.

Capital maintenance activity varies from year to year. In order to avoid econometric efficiency assessments that fluctuate from one year to the next, we model average expenditure over a period of time. This is different from the approach we use to assess relative operating expenditure efficiency where we look at a single year's expenditure.

We take this approach to assessing capital maintenance efficiency in order to take account of annual variations in capital maintenance expenditure. Operating expenditure is less susceptible to significant variations year on year.

This year we have reviewed our approach to make sure that we show the best picture of companies' current relative capital maintenance efficiency. Companies have introduced substantial changes to their approach to capital maintenance since 1998-99, in particular through the development of the common framework. To reflect these changes, we have modelled a six-year average expenditure for the period 2000-01 to 2005-06.

We are continuing to use 1997-98 data for the explanatory variables, as collected in the 2002 capital maintenance econometric return. Ideally, we would also update our explanatory data in line with the period under consideration (in this case from 1999-2000). But this has not been possible because up-to-date data on all explanatory variables in our models is not available for this period. However, this data does not change substantially over a two-year timeframe (in contrast to the expenditure data). On balance, we believe the approach we have taken represents the best practicable means for our published assessment this year.

We will consider the scope to use more up-to-date explanatory data for our assessment next year, as part of our work to review our modelling approach for the 2009 price review.

With one exception we have used the models that were used for the 2004 price review, which have been updated using the six-year average expenditure. This year, we have removed one variable from the sewerage infrastructure model. This is because the variable is no longer significant.

For relative capital maintenance efficiency, we combine the results of the econometric models and unit cost comparisons and then band companies at 10% intervals from the benchmark company. Companies that we assess to be more efficient than the benchmark, but that do not fulfil our benchmark criteria, are also put in band A. This approach differs from that taken for operating expenditure where we use a 5% band A. The approach that we take on capital maintenance ensures that the capital maintenance bandings can be compared historically. This approach has been the same since the 1999 price review when the companies were more widely spread on capital maintenance. We are keen to move away from the 10% band A approach for capital maintenance and use the same approach as operating expenditure. We aim to do this as part of the development of the capital maintenance models for the next price review.

2.3 International comparisons

Each year we publish the 'International comparison of water and sewerage service' report, which compares the performance of international water enterprises with the regulated companies in England and Wales. We aim to publish this year's report, comparing data for the year 2004-05, early in 2007. Our analysis of international companies can give us a general indication of the relative unit cost performance of the companies operating in England and Wales. However, it is hard to assess relative efficiency for companies that are not subject to the same regulatory regime. This is because regulatory data for the England and Wales water industry is audited and reported to standardised definitions and assumptions that may not, as yet, be comparable with the data reported in other countries. Despite this, we are making good progress in working with the Scandinavian 6-cities group, which comprises companies from Copenhagen, Gothenburg, Helsinki, Malmo, Oslo and Stockholm.

3. Water service relative efficiency assessment

This chapter provides our 2005-06 assessment of each company's operating and capital maintenance relative efficiency for water. Our assessment of relative efficiency for the sewerage service is reported separately in chapter 4 (page 37). Information on the econometric models and unit cost comparisons that we use to assess relative efficiency is set out in appendix 1 on page 44.

3.1 Operating expenditure relative efficiency

We have re-estimated the operating efficiency models using 2005-06 data.

We assess relative operating efficiency using econometric models for:

- water distribution;
- water resources and treatment;
- water power; and
- water business activities.

Further information, including the form and coefficients of the models, can be found in the on-line version of this report.

We combine the results of the water service models together with any adjustments for atypical costs, company-specific special factors and pension costs. We then compare these to give an overall water service operating efficiency assessment.

Leakage adjustments

We make some adjustments to modelled water service operating and capital maintenance expenditure to ensure consistent treatment of leakage control costs between companies. We made fewer adjustments in 2005-06 than in previous years as companies moved leakage control costs from capital maintenance to operating expenditure in line with our assumptions at the 2004 price review.

For modelling purposes we made an adjustment to the operating expenditure of Anglian and Southern. We increased these companies' operating expenditure and reduced their capital maintenance expenditure.

We first made these leakage adjustments to our assessments of relative efficiency in

2002-03. We make these adjustments to the data in the water distribution operating expenditure econometric model. Table 9 shows the operating expenditure adjustments for the two companies for 2005-06.

Table 9 Operating expenditure adjustments for leakage control costs

Company	Leakage expenditure (2005-06) £m
Anglian	1.5
Southern	1.3

3.2 Capital maintenance relative efficiency

We base our assessment of capital maintenance efficiency on a combination of econometric models and unit cost models. We carry out this assessment on each of the water service expenditure areas for:

- water distribution infrastructure (water mains network);
- water distribution non-infrastructure (pumping stations and water storage);
- water resources and treatment; and
- water management and general.

The capital maintenance assessment consists of one unit cost comparison (water resources and treatment) and three econometric models.

In 2005-06 we estimated the capital maintenance models using a six-year average of expenditure (2000-01 to 2005-06). This has allowed us to take account of annual variations in capital maintenance expenditure and avoid efficiency assessments that fluctuate excessively from year to year. The six-year expenditure period ensures that the impact of peaks and troughs on the average is reduced. By excluding capital maintenance expenditure for 1998-99 and 1999-2000 from the average we are removing historical expenditure that may no longer reflect a company's current capital maintenance practices.

Leakage adjustments

We have made leakage adjustments to our capital maintenance assessments for seven companies. We based our adjustments for capital maintenance on average leakage expenditure re-allocations over the period 2000-01 to 2005-06. We have made more adjustments to the capital maintenance assessment (than for our operating expenditure assessment) because the capital maintenance assessment is

based on a six-year average of expenditure. These capital maintenance adjustments are shown in table 10.

We have made a downward adjustment to modelled capital maintenance expenditure for six companies, and a corresponding upward adjustment to operating expenditure for two of these companies. This is because we believe that these costs are operating costs and should not be included in the capital maintenance assessment of relative efficiency. We have increased Folkestone & Dover's capital maintenance expenditure to make sure that there is consistency between operating and capital maintenance expenditure allocation. This adjustment has not affected Folkestone & Dover's efficiency band as it is beyond the benchmark. However, it has changed the company's relative position within the company ranks.

Table 10 Capital maintenance expenditure adjustments for leakage control costs

Company	Average leakage expenditure (2000-01 to 2005-06)	
	Expenditure removed from capital maintenance expenditure £m	Expenditure included in capital maintenance expenditure £m
Anglian	2.5	–
South West	3.2	–
Southern	1.8	–
Thames	37.6	–
Yorkshire	5.6	–
Folkestone & Dover	–	0.1
Mid Kent	0.3	–

We also made adjustments to the capital maintenance econometric efficiency assessment to take account of company-specific special factors. More information on these adjustments is included in appendix 2 on page 46.

We assess each company's position relative to the benchmark company. The results of this analysis are covered in section 3.3.

3.3 Water service assessment

Table 11 on page 35 sets out our 2005-06 assessments of relative operating and capital maintenance efficiency. It shows each water company's efficiency bandings together with its relative efficiency rankings.

Within these operating and capital maintenance efficiency bands, there are variations in the levels of service provided by each company. One way to assess performance is to compare the efficiency results with the indicators published in our 'Levels of

service for the water industry in England and Wales' report. There is evidence for 2005-06 that good standards of customer service do not necessarily require higher costs. For example, South Staffordshire, Yorkshire and Portsmouth had the third, fourth and fifth highest overall score respectively in the water supply and customer service overall performance assessment for all companies in 2005-06. And these companies are banded A for both water operating and capital maintenance relative efficiency.

Figure 4 on page 36 presents the same information as table 11 in the form of a matrix that compares operating and capital maintenance efficiency bands. This year, we have used Yorkshire as the benchmark for assessing relative operating efficiency for the water service. It is ranked second in our relative efficiency assessment behind Southern.

We decided not to use Southern as the benchmark for two reasons. Southern has reported a large exceptional item in 2005-06 relating to the non-recurring costs of its own investigation into its levels of customer service. Exceptional items are excluded when we assess relative efficiency. Although we have accepted this exceptional item for determining Southern's own relative efficiency, we have concerns about this affecting the relative efficiency of other companies – as it would were Southern to be the benchmark. Secondly, our investigations into irregularities in relation to Southern's levels of customer service continued through the reporting year and are not yet concluded.

This year, we have assessed fewer companies as band A for relative operating efficiency compared with 2004-05. We believe this is due to Yorkshire moving the benchmark forwards rather than a decline in other companies' performance.

For capital maintenance, the most efficient company based on the econometric models in 2005-06 is Portsmouth. The most efficient company suitable for comparison with the rest of the industry is Northumbrian, which ranks thirteenth in our assessment. Although Northumbrian is a significant way down the efficiency rankings, the twelve companies ranked higher do not provide us with an acceptable comparison for the rest of the industry.

This is because Portsmouth (the frontier), and Folkestone & Dover (ranked fifth) are too small even if combined to satisfy our benchmark criteria. We have not used the remaining ten companies as the benchmark company due to a combination of their serviceability assessments, the size of their special factor allowances and, in the case of Anglian, South West, Thames and Yorkshire, adjustments for leakage cost allocation.

Our benchmark criteria ensures that we do not use a company which has special circumstances which might make it look more efficient. If we were to remove all adjustments for special factors and leakage allocations for all companies, Northumbrian would be ranked eighth. There are two companies higher up the ranking that are large enough to be the benchmark; Three Valleys and Severn Trent. Three Valleys has a deteriorating serviceability assessment for water infrastructure, meaning that it is not a suitable comparator. A company which has marginal or deteriorating serviceability may be higher up the efficiency rankings because it has not been spending money to maintain its assets. In the case of Severn Trent, we have decided not to select the company as a benchmark this year due to ongoing investigations into customer service irregularities.

We have used Northumbrian as the benchmark company since our 2003-04 relative efficiency assessment. In 2005-06, Northumbrian moved down the efficiency rankings. This has reduced the gap between Northumbrian and the least efficient company.

Our banding of capital maintenance relative efficiency is based on 10% bands relative to the benchmark company's position. This is different from the approach taken on operating efficiency where a band A company is within 5% of the benchmark or beyond. Our approach to capital maintenance means that more companies are able to achieve band A status. If we were to change our band A width to 5%, Dŵr Cymru, United Utilities and Dee Valley would have been a band C.

Yorkshire, Portsmouth and South Staffordshire were in band A for both operating and capital maintenance relative efficiency.

Table 11 Relative operating and capital maintenance efficiency bands and ranks – water service 2005-06

	Operating efficiency		Capital maintenance efficiency	
	Band A to E	Rank 1-22	Band A to E	Rank 1-22
Water and sewerage companies				
Anglian	B	9	A	10
Dŵr Cymru	B	18	B	19
Northumbrian	B	12	A	13
Severn Trent	B	15	A	9
South West	C	19	A	12
Southern	A	1	B	17
Thames	D	22	A	2
United Utilities	B	10	B	21
Wessex	A	3	C	22
Yorkshire	A	2	A	6
Water only companies				
Bournemouth & W Hampshire	B	7	A	8
Bristol	B	17	A	11
Cambridge	B	11	A	3
Dee Valley	B	6	B	20
Folkestone & Dover	C	21	A	5
Mid Kent	B	13	B	18
Portsmouth	A	4	A	1
South East	B	14	B	16
South Staffordshire	A	5	A	7
Sutton & East Surrey	B	16	A	15
Tending Hundred	B	8	A	14
Three Valleys	C	20	A	4

Figure 4 Relative operating and capital maintenance efficiency – water service 2005-06

Operating efficiency banding	A Within 5% of benchmark			Wessex	Southern	Yorkshire, Portsmouth, South Staffordshire
	B Between 5% and 15% of benchmark				Dŵr Cymru, United Utilities, Dee Valley, Mid Kent, South East	Anglian, Northumbrian, Severn Trent, Bournemouth & W Hampshire, Bristol, Cambridge, Sutton & East Surrey, Tendring Hundred
	C Between 15% and 25% of benchmark					South West, Folkestone & Dover, Three Valleys
	D Between 25% and 35% of benchmark					Thames
	E Greater than 35% of benchmark					
		E Greater than 40% of benchmark	D Between 30% and 40% of benchmark	C Between 20% and 30% of benchmark	B Between 10% and 20% of benchmark	A Within 10% of benchmark
Capital maintenance efficiency banding						

4. Sewerage service relative efficiency assessment

We have less scope for developing econometric models for the sewerage service than for the water service because there are only ten regulated sewerage companies. The development of robust econometric models for each year requires more than ten sets of data. To overcome this problem, we collect more detailed sewerage information in the June returns. We do this by collecting information for a number of areas within each company's sewerage region. For operating expenditure we also collect some information on individual large sewage treatment works and small sewage treatment works split by size band.

Information obtained on this basis is not ideal, as it would be better to have information from a larger number of independent companies, but it does allow us to develop econometric models for key aspects of the sewerage service.

4.1 Operating expenditure relative efficiency

We divide the operating efficiency assessment for the sewerage service into five expenditure areas:

- sewerage network (including power);
- large sewage treatment works;
- small sewage treatment works (and sea outfalls);
- sludge treatment and disposal; and
- sewerage business activities.

The sewerage service models consist of two econometric models and three unit cost models for:

- small sewage treatment works;
- sludge treatment and disposal; and
- sewerage business activities.

This means that we assess a company that has relatively high unit costs as less efficient for that activity.

The two econometric models (sewerage network and large sewage treatment works) are described in more detail in the on-line version of this report. This includes the form and coefficients of these models.

We combine the results of the sewerage service models together with any adjustment for atypical costs, special factors and pension costs to give an overall sewerage service operating efficiency band.

4.2 Capital maintenance efficiency

As with operating expenditure, our assessment of capital maintenance efficiency for the sewerage service is based on a combination of econometric models and unit cost comparisons.

We divide the efficiency assessment for the sewerage service into five expenditure areas:

- sewage treatment;
- sewerage infrastructure (sewer network);
- sewerage non-infrastructure (pumping stations);
- sludge treatment and disposal; and
- sewerage management and general.

In order that we develop robust econometric models, we collect asset and expenditure data for each sub-region within each company's area relating to all of these models excluding sewerage management and general. We collect detailed explanatory data every five years in the capital maintenance econometric return and expenditure data annually in the June returns.

We assess the sewerage service using two econometric models and three unit cost models for:

- sewerage non-infrastructure;
- sludge treatment and disposal; and
- sewerage management and general.

We have taken the same approach to modelling the sewerage service as we have for the water service, by using an average expenditure over a six-year period (2000-01 to 2005-06). This average takes account of annual variations in capital maintenance expenditure and avoids excessive fluctuation in annual efficiency assessments.

This year, we have removed expenditure for 1998-99 and 1999-2000 from our average to ensure that our assessment more closely reflects a company's current capital maintenance practices. At an industry level this means that the average expenditure drops by less than 2%. The impact on individual companies varies.

We combine the results from the econometric models and the unit cost models and make our adjustments for company-specific special factors. We then assess each

company's position relative to the benchmark company. This forms our sewerage service assessment of capital maintenance efficiency. More information on company-specific special factors is included in appendix 2 on page 46.

The two capital maintenance econometric models (sewage treatment and sewerage infrastructure) are described in more detail in the on-line version of this report.

4.3 Sewerage service assessment

The results of our 2005-06 sewerage service assessment of relative efficiency and the rankings of the individual companies are set out in table 12.

Figure 5 on page 41 presents the same information as table 12 in the form of a matrix that compares operating expenditure and capital maintenance efficiency bands.

In 2005-06 the frontier and benchmark company for relative operating efficiency is Yorkshire. Thames was the frontier company in 2004-05, but we did not use Thames as the benchmark company as it had a large adjustment for company-specific special factors relating to its specific operating circumstances. In 2004-05 we therefore banded companies against the next most efficient company, Yorkshire. As a result, the benchmark company has not changed this year. As was the case in 2004-05, the difference between the relative operating efficiency of Yorkshire and Thames is small.

The frontier and benchmark company based on the econometric and unit cost models for capital maintenance in 2005-06 is Wessex for the third year running. This year's assessment is based on a six-year average (2000-01 to 2005-06). This year the gap between the most and least efficient companies has become wider.

Southern is again assessed as band D in our capital maintenance relative efficiency assessment for the sewerage service. This reflects the company's timely efforts to recover deteriorating serviceability. In future years, when stable serviceability has been recovered, the company will be better placed to focus on efficiency. A further two companies (Thames and Northumbrian) that have dropped bands in this year's assessment are also currently subject to action plans to recover deteriorating serviceability for sewerage or sewage treatment assets.

As with our water service assessment, when assessing capital maintenance relative efficiency, we allocate companies to bands of 10% intervals from the benchmark company. If we were to take a similar approach to operating efficiency and use a 5% band A:

- Anglian and Yorkshire would be a band B;
- Northumbrian and Severn Trent would be a band C;
- South West and United Utilities would be a band D; and
- Southern would be a band E.

Wessex and Yorkshire achieved band A status for both operating and capital maintenance relative efficiency for the sewerage service. Yorkshire also achieved band A in the operating and capital maintenance efficiency assessments for the water service, meaning that it has achieved band A across our range of efficiency assessments.

Table 12 Relative operating and capital maintenance efficiency bands and ranks – sewerage service 2005-06

	Operating efficiency		Capital maintenance efficiency	
	Band A to E	Rank 1-10	Band A to E	Rank 1-10
Water and sewerage companies				
Anglian	B	5	A	2
Dŵr Cymru	B	9	B	4
Northumbrian	B	7	B	6
Severn Trent	B	8	B	7
South West	B	4	C	8
Southern	B	6	D	10
Thames	A	2	B	5
United Utilities	C	10	C	9
Wessex	A	3	A	1
Yorkshire	A	1	A	3

Figure 5 Relative operating and capital maintenance efficiency – sewerage service 2005-06

Operating efficiency banding	A Within 5% of benchmark				Thames	Wessex, Yorkshire
	B Between 5% and 15% of benchmark		Southern	South West	Dŵr Cymru Northumbrian, Severn Trent	Anglian
	C Between 15% and 25% of benchmark			United Utilities		
	D Between 25% and 35% of benchmark					
	E Greater than 35% of benchmark					
		E Greater than 40% of benchmark	D Between 30% and 40% of benchmark	C Between 20% and 30% of benchmark	B Between 10% and 20% of benchmark	A Within 10% of benchmark
Capital maintenance efficiency banding						

5. Developments in the assessment of relative efficiency

5.1 Review of the 2004 price review

After announcing our final determinations of price limits in December 2004, we appointed an independent Steering Group to examine the way we had carried out the 2004 price review.

The Steering Group submitted and published its report to us in August 2005. The Group reported a high level of satisfaction with the way we carried out the price review and highlighted that our stakeholders agreed that it was a major improvement on previous price reviews. However, stakeholders did have concerns with some aspects of the process and the Steering Group set out 23 recommendations for us and the other involved parties to consider.

Some of the Steering Group's recommendations related to our approach to efficiency. The Steering Group saw merit in a joint industry review of efficiency, although it recognised that final decisions on future efficiency would properly fall to us.

5.2 Preparation for the 2009 price review

In light of the Steering Group's comments and in preparation for the 2009 price review, we have been working with the industry on a joint project on our approach to assessing efficiency in the water industry. A project steering group was formed to include representatives from Ofwat, UKWIR and the industry. In March 2006, the group appointed consultants (Reckon) to review our approach to assessing efficiency. The review has focused on making recommendations that produce an approach to efficiency analysis that:

- encourages efficiency and innovation;
- protects the interests of consumers; and
- enables companies to finance their functions.

The project is due to be completed in January 2007. As the completion date approaches, the following five areas have been identified for possible development.

- Improving the transparency of the key regulatory judgements.
- Integration of the capital maintenance efficiency analysis with capital maintenance planning.
- Improving the structure and approach to studies on the scope for future efficiency.

- Integration of special factor adjustments into the efficiency modelling process.
- Taking advantage of available data to enrich the econometric modelling process.

The group held a workshop in early November 2006 where other stakeholders were able to provide their views on the progress and the options considered.

We will consider the findings of this project in making our decisions on the approach to the 2009 price review.

5.3 Other developments ahead of the 2009 price review

We are jointly sponsoring a research project with the Economic and Social Research Council. The project is on the development of methods for assessing efficiency and productivity in environments where the number of companies is limited, yet each company is complex. Such is the case in the water industry. The research will focus on addressing problems of comparison that limited data points present and on developing or adapting methodologies for dealing with the issues arising. The research will use the water industry in England and Wales as a vehicle to address the consequent problems of assessment. We expect the results to be more broadly applicable to the fields of productivity and efficiency measurement.

In the coming year we will be carrying out a review of our approach to the capital maintenance econometric models and capital maintenance econometric return. We are planning to publish a discussion paper to explore the possibility of improving the models, and including issues raised by the joint project on our approach to assessing efficiency. We will also seek to involve companies and industry experts in considering the potential to improve the explanatory variables used in our modelling.

Over the last year we have reviewed our water resources and treatment operating expenditure model. We will continue to review the sludge treatment and disposal operating expenditure model with the help of the industry. We will also review the operating expenditure models as necessary in light of the statistical performance of the models and the conclusions from the joint project.

Since the 2004 price review we have carried forward companies' special factor allowances and made the appropriate adjustments to their efficiency assessments. Where a company has submitted a new claim we have reviewed this and made the appropriate adjustments to our assessment. In the coming year and in light of the findings from the joint project on efficiency we will be reviewing our approach and assessment of these claims. This will inform our efficiency assessments for the 2009 price review.

Appendix 1: Efficiency models

Further information, including the form and coefficients of the econometric models, and details of the unit cost models, is set out in this appendix in the on-line version of this report.

Operating expenditure – water models

We assess operating expenditure relative efficiency for the water service using four econometric models:

- water distribution;
- water resources and treatment;
- water power; and
- water business activities.

Operating expenditure – sewerage models

Three of the five operating expenditure models for the sewerage service are unit cost models for:

- small sewage treatment works;
- sludge treatment and disposal; and
- sewerage business activities.

The two remaining models, large sewage treatment works and network (including power), are econometric models.

Capital maintenance expenditure – water models

The capital maintenance assessment consists of one unit cost comparison (water resources and treatment) and three econometric models:

- water distribution infrastructure;
- water distribution non-infrastructure; and
- water management and general.

Capital maintenance expenditure – sewerage models

For capital maintenance expenditure, we assess the sewerage service using unit cost models for:

- sewerage non-infrastructure;
- sludge treatment and disposal; and
- sewerage management and general.

The remaining two models, sewage treatment and sewerage infrastructure, are econometric models.

Appendix 2: Company-specific special factors and capital maintenance regional price adjustment

Company-specific special factors

The econometric models take into account factors that describe the size or operating environment of different companies. However, there are some factors that are specific to each company or a group of companies that we cannot incorporate into our econometric models. Such company-specific special factors typically lead to higher operating or capital maintenance costs, which in the short to medium term are outside management control. We need to take account of these when we interpret the results of our econometric models. Special factors can include legal requirements or circumstances peculiar to an individual company's area of operation.

In the run-up to the 2004 price review we asked companies to submit claims for special factors to include in our relative efficiency assessments. We asked companies to provide us with information about each claim based on the four criteria listed below.

- What is different about the circumstances that cause materially higher costs?
- Why do these circumstances lead to materially higher costs?
- What is the net impact of these costs on prices? What has been done to manage the additional costs arising from the different circumstances and to limit their impact?
- Are there any other different circumstances that reduce the company's costs relative to the industry norms?

As part of the final determination of price limits for 2005-10, we provided feedback to companies on their special factor claims.

For capital maintenance, we have rolled forward all the adjustments included in last year's assessment and revised these allowances to reflect the six-year period of expenditure we have modelled. One company submitted new claims for 2005-06. We have assessed these claims and made some allowances in our assessment. We apply special factors to our capital maintenance relative efficiency assessment after adjustment for leakage allocation.

A number of companies submitted new claims for operating expenditure in 2005-06. Table 13 summarises the types of special factors we allowed in the assessments of relative efficiency for 2005-06.

Table 13 Special factors

	Number of companies
Operating expenditure	
Water resources (including bulk supplies)	9
Water quality	4
Water treatment	11
Leakage	3
High level of meter penetration	5
Sewage treatment and sludge	4
Location:	
– Regional salaries and construction costs	8
– Regional power costs	4
– Debt	6
– Coastal sewage treatment works	2
– Traffic congestion	3
– Burst rate	2
– Location (other)	5
– Welsh language obligations	1
Size and number of assets (including rurality)	3
Company size	2
Accounting for depreciation	1
Large industrial customers	2
Capital maintenance expenditure	
Shared water resources	1
Water treatment	1
Tight ammonia discharge consent	1
Number of meter replacements	2
High seasonal tourist population	1
Regional price adjustment	9
Impact of reservoir safety	1
Impact of coal mining	1
Company size	3
M6 toll road	1

Figures 6a and 6b show the impact that our adjustment for special factors had on companies' relative efficiency bands for 2005-06. The graphs show the number of companies who moved bands because of their special factor adjustments.

Figure 6a Impact of special factors on operating expenditure relative efficiency bands

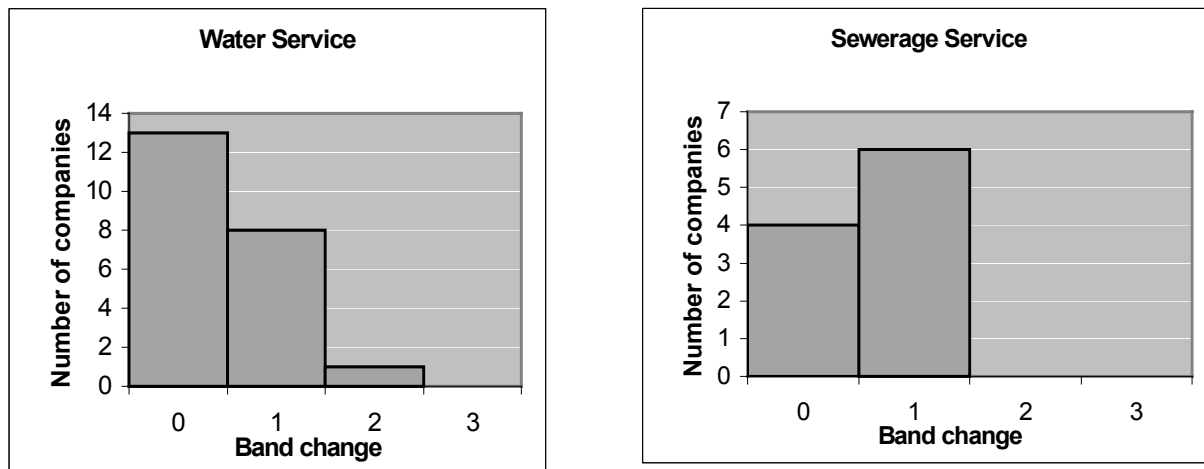
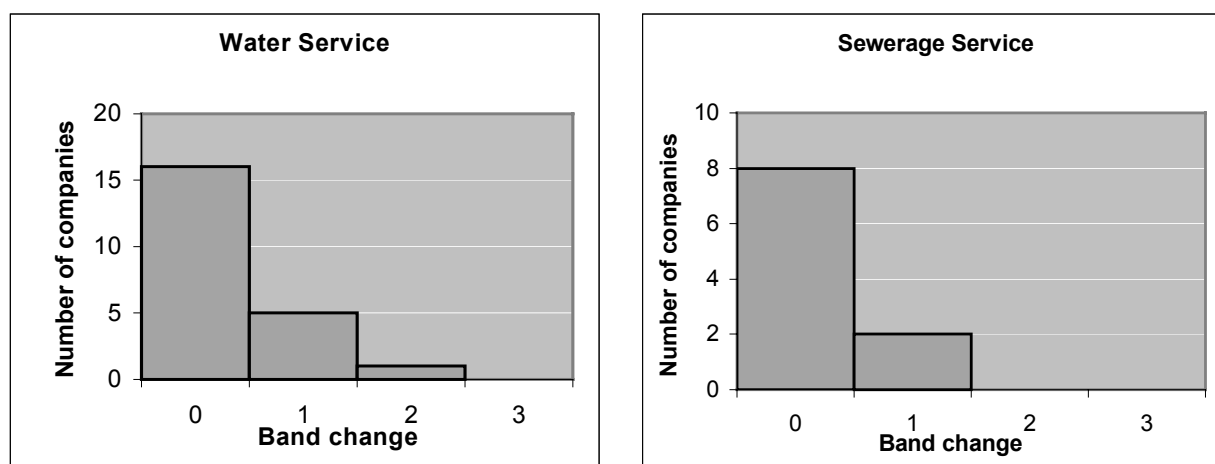


Figure 6b Impact of special factors on capital maintenance relative efficiency bands



Capital maintenance regional price adjustment for 2005-06

In 2003-04 we made an assessment of the impact regional construction costs may have on the relative efficiency assessment of the water and sewerage companies. We based this adjustment on a study of building and construction cost indices (including the effects of labour) published by the Royal Institution of Chartered Surveyors' Building Cost Information Service (BCIS). We made adjustments for nine companies operating in regions that the national statistics show have significantly above average costs. This adjustment was applied to a proportion of companies' capital maintenance expenditure, which are subject to higher regional costs.

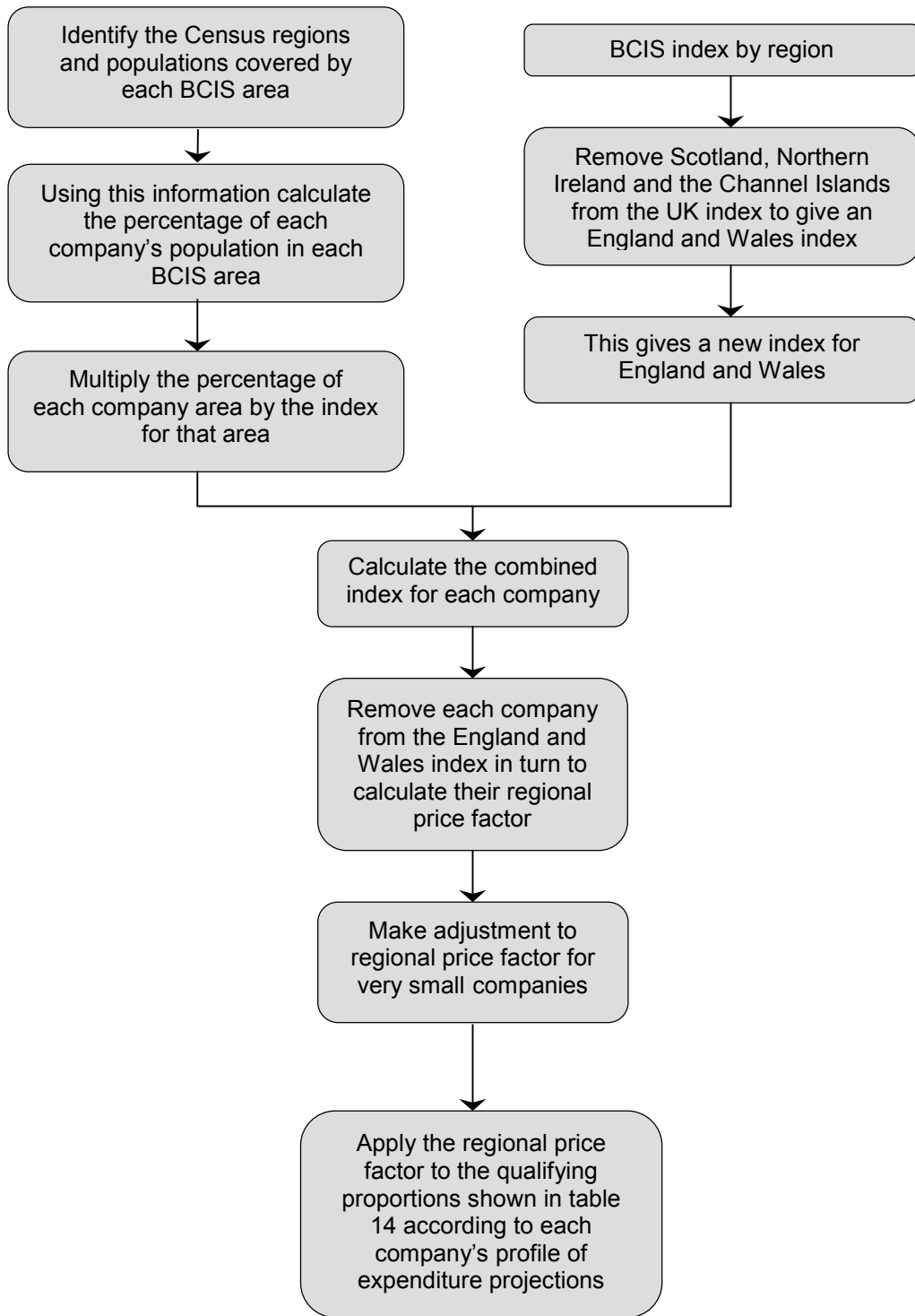
We have updated our analysis for 2005-06 with the most recent index available from BCIS (July 2006). The 2006 index shows lower costs for the south-east compared to 2004 and 2005. There are also increases in the index for northern areas. At the top end of the scale in 2003-04 the Greater London area had a UK index of 1.20. In 2005-06 this had reduced to 1.13. The Northern area of the country had a UK index of 0.93 in 2003-04, which increased to 0.99 in 2005-06.

To make our assessment of regional prices for England and Wales we have removed Scotland, Northern Ireland and the Channel Islands from the index. Our assessment indicates that there is overall scope for regional price variation factors of between 2% and 11% compared with the England and Wales average. Not all of this adjustment is relevant to capital maintenance activity. We apply this index to a proportion of capital maintenance expenditure. These proportions are detailed in table 14. Our assessment process is summarised in figure 7.

Table 14 Percentage of expenditure that attracts a regional price adjustment for econometric assessment

Water service		Sewerage service	
Expenditure area	%	Expenditure area	%
Water resources	100	Sewers	88
Water treatment works – surface	57	Sewer structures	80
Water treatment works – ground	67	Sewage pumping stations	21
Storage	100	Sewage treatment – preliminary	100
Pumping stations	19	Sewage treatment – primary	100
Potable mains	72	Sewage treatment – secondary	62
Communication pipes	80	Sewage treatment – tertiary	62
Meters	50	Sea outfalls	100
Management and general	80	Sludge treatment and disposal	60
		Management and general	80

Figure 7 Flow chart for the assessment of the effect of regional prices for construction



Appendix 3: Background on operating and capital maintenance costs

Definition of operating costs

Operating costs include:

- employment costs;
- energy costs;
- materials; and
- hired and contracted services.

We model companies' reported operating costs after excluding the costs of third party services and exceptional costs, such as restructuring. Both third party and exceptional costs can vary considerably from year to year, distorting underlying trends. We have excluded costs relating to assets, such as depreciation and infrastructure renewals, from operating costs. We have also excluded capital spending and the cost of financing capital.

Breakdown of operating costs

For reporting purposes, companies break down their operating costs in two complementary ways, by function and by activity (see figure 8).

Atypical operating costs

Companies identify and report atypical costs that are not part of the continuing operation of the business. Such costs include:

- provisions for restructuring;
- extreme climatic events;
- costs associated with takeover bids or bid defence;
- compensation payments to customers; and
- abnormal changes in pension contributions.

Some companies declare these and similar items as 'exceptional items' in their accounts. Others report them within normal costs. We have noted atypical costs reported by companies within normal costs where they are more than 1% of operating costs for each service in figure 9 on page 53. We have excluded third party costs, local authority rates and Environment Agency and British Waterways costs from our econometric modelling. Therefore, we have not shown unusual changes in these costs in figure 9.

Inflation effects

The information in this report is set out in 2005-06 prices. We have made the adjustments using the average Retail Price Index for the financial year.

Figure 8 Breakdown of operating costs

Function	Water service	Water resources and treatment Water distribution Business activities
	Sewerage service	Sewerage Sewage treatment Sludge treatment and disposal Business activities
Activity	Direct costs	Employment Power Hired and contracted services Agencies Materials and consumables Service charges Bulk imports (water) Other
	General and support	
	Business operating expenditure	Customer services Scientific services Rates Doubtful debts Other

Figure 9 Atypical operating costs in 2005-06

	Cost £m	Percentage of water/sewerage service operating costs	Reason
Water service			
South West	0.82	1.1	Restructuring, compensation
Yorkshire	2.35	1.7	Restructuring, dry weather costs, compensation
Folkestone & Dover	-0.22	-3.1	Bulk supply costs, reduced electricity demand
Mid Kent	0.23	1.2	Dry weather costs
South East	0.96	2.0	Legal costs, dry weather costs, distribution incident costs, salary adjustment
Sutton & East Surrey	0.30	1.3	Pensions
Tendring Hundred	-0.17	-3.2	Section 74 credits, regulation costs, unfilled vacancies, legal costs, insurance claim, release of accruals
Three Valleys	-2.00	-2.2	Release of accruals
Sewerage service			
United Utilities	5.40	2.5	Legal costs, contract set-up costs
Severn Trent	-3.10	-1.4	Release of provision, restructuring, third party insurance provision
Yorkshire	1.23	1.1	Restructuring, compensation, flooding costs, accidental damage costs, legal fees

Notes:

1. We have taken atypical operating costs from the June return 2006 commentaries to tables 21 and 22 and from subsequent responses to queries.
2. Negative numbers represent unusual savings. Positive numbers represent unusual costs.
3. Only atypicals that sum to 1% or more of companies' operating expenditure are shown in the table above.

Definition of capital maintenance costs

Companies incur capital maintenance costs for maintaining (and restoring where applicable) stable serviceability of their assets. For reporting purposes, companies break down their costs in two complementary ways. These are by operational asset classification and by accounting asset classification (see figure 10).

Figure 10 Breakdown of capital maintenance costs

Operational asset classification	Water service	Water resource facilities Water treatment works Water distribution mains Service reservoirs and water towers Pumping stations Management and general
	Sewerage service	Sewerage Sea outfalls and headworks Sewage treatment works Sludge treatment works Sludge disposal In-line pumping stations Terminal pumping stations Management and general
Accounting asset classification	Infrastructure assets	Underground systems Impounding and raw storage reservoirs Dams Sludge pipelines and sea outfalls
	Non-infrastructure assets: – operational assets	Intake works Pumping stations Treatment works Boreholes Operational land Offices, depots and workshops Residential properties directly connected to supplies Land held for the purpose of protecting the wholesomeness of water supplies
	– other tangible assets	Non-operational plant Machinery Vehicles Surplus land



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ISBN 1 904655 33 5

Printed on 75% minimum de-inked post-consumer waste paper

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