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1. FOREWORD

This is the third report to be published by Ofwat examining the relative performance of the regulated companies in England & Wales and water and sewerage enterprises in other countries. This report builds on previous work but goes further in comparing the companies in England & Wales against a much wider set of enterprises in three different countries; Australia, the Netherlands and the USA.

Most of the data used in compiling this report has been sourced from published documents. The exception is Sydney Water which, for the third year, has volunteered to submit data consistent with Ofwat's reporting regime directly to Ofwat for analysis. I would like to pay tribute to Sydney Water for their continuing commitment to this initiative.

These comparisons enable Ofwat and other interested parties to set the performance of the England & Wales companies in a wider context and to compare their performance with international best practice. Where such comparisons lead to improved performance, customers in England & Wales benefit. Even in a competitive market, which the water industry in England & Wales has begun to move towards, there is a need for good quality comparative information, particularly in areas such as levels of service and environmental performance, to enable informed choices to be made.

As Sydney Water has recognised and demonstrated through its commitment, this type of comparison, on the basis of consistent data, also brings great benefits to the overseas enterprises involved.

W H EMERY
Director of Costs & Performance and Chief Engineer

2. SUMMARY

Purpose of the Report

Comparative competition is at the heart of Ofwat's incentive-based system of regulation. The model of comparative competition developed by Ofwat over the last ten years has served customers well, being a central plank of the recent periodic review of price limits. Being able to compare companies' activities and operational performance has helped to deliver improved services at lower costs as well as enabling the identification of poorly performing companies.

This report reviews information for 1998-99 from overseas enterprises with a view to identifying suitable comparators to better inform future judgements about the relative performance of the regulated companies in England & Wales. International data on bills, costs and performance will provide important evidence of whether companies in England & Wales are providing best value for money for their customers.

The report concentrates on comparator enterprises from a restricted number of countries where there is data available; Australia (urban territories), the Netherlands and the USA. In addition to the availability of data, the choice of comparators was made on the basis of the water and sewerage providers in these countries having, to some extent, a distinct corporate identity. This contrasts with other regimes where water and sewerage provision is one of the consolidated functions of local government. In addition, some efforts at benchmarking have already been undertaken in these countries, which has meant that a number of distorting factors have been identified and removed.

Data comparability warning

The data used in this report has been compiled from a variety of sources including trade association publications and the annual reports and accounts of the enterprises concerned. Differences in definitions used and assumptions made may therefore mean that information is not on a comparable basis to that carefully defined in the June Return[1] and audited by technical Reporters and financial Auditors. Potential problems with the data are set down in Annex A.

Ofwat considers that the data set down in this report is sufficiently comparable to enable generalised conclusions to be drawn. However, caution should be exercised before any specific regulatory or business decisions are taken based on these comparisons with the user carrying out further investigations to assess the effect of the slightly differing definitions and assumptions in the countries concerned.

The data has been collated for the financial year 1998-99. In the UK the financial year runs from April to March, in Australia from July to June and in the USA and the Netherlands the data is for calendar year 1998.

Information is available in a number of key areas including unit cost information on the components of customers' bills, water consumption and leakage, and financial indicators. Comparable data on the quality of customer service or on compliance with quality standards is

[1] Previously known as the July Return

not widely available. Financial information collected from outside the UK will vary depending on exchange rates. In this report, average rates over the relevant period have been used (see Table 7). However even over 12 months, exchange rates may not reflect differences in the purchasing power of different currencies. Sterling was particularly strong over the 1998-99 period, particularly compared to European currencies. The unit cost and efficiency comparisons therefore need to be treated with some caution.

The broad conclusions drawn in the areas of unit costs, water delivered & leakage and financial ratios are presented below. More detailed comparisons, country by country, are set out in four separate sections; A1 – Sydney Water, A2 – Other Australia companies, B – the Netherlands and C – USA.

Unit costs of water and sewerage services

Table 1 sets out simple unit costs of water delivered and sewage collected in the same form as Ofwat's annual *Report on Water and Sewerage Unit Costs and Relative Efficiency*. The tables identify operating expenditure and capital maintenance charges. These items are then subtracted from the turnover for the service concerned to give the implied return on capital element as a residual.

Table 1 Costs per unit of water delivered (p/m^3)

Weighted averages (by turnover)	England & Wales	Australia*	Netherlands*	USA*
Cost of Operations	32	18	45	20
Cost of Capital Maintenance	18	7	17	5
Return on Capital	21	12	14	19
Abstraction Tax	-	-	*9*	-
TOTAL COST	**71**	**37**	**85**	**44**

* Weighted average of those companies included in this report (Australian average includes Sydney Water)

For the water service, countries with high levels of per capita consumption and household demand (USA and Australia) deliver water at apparently lower cost than their counterparts in Europe where water use is much lower. This appears to be reflected in lower volumetric bills. The extent to which this is reflective of efficiency rather than economies of scale in water distribution and treatment is more doubtful. When two of the Australian comparators in this report (Sydney Water and Water Corporation) were compared using Ofwat's more sophisticated operating cost models they were no better than the England & Wales average[1]. However, other businesses in Australia operate at even lower unit costs.

Costs in the Netherlands appear to be reasonably comparable though somewhat higher than in England & Wales. State owned enterprises generally have a lower bill component going to the owners of the business. This is partly due to the fact that governments can borrow at lower interest rates than private enterprises and there are often no (or at least much lower) dividends

[1] *Comparing the performance of England & Wales water & sewerage companies with Sydney Water and Water Corporation Western Australia*, Ofwat, August 1999

paid. However it may also reflect an element of subsidy in that the providers of capital (i.e. the government) are not earning a satisfactory return.

Table 2 Costs per unit of sewage collected (p/m^3)

Weighted averages (by turnover)	England & Wales	Australia	Netherlands*	USA*
Cost of Operations	28	24		
Cost of Capital Maintenance	24	11		
Return on Capital	43	19		
TOTAL COST	**95**	**54**		

*Only data for the water service is available for the Netherlands and USA.

For the sewerage service a similar picture emerges on volumetric unit costs. Comparisons show Australia, with higher volume collected per head, with much lower unit costs. However these comparisons are less meaningful for the sewerage service. The key service provided is the removal, treatment and disposal of sewage (including surface water in combined sewer systems). The size of this task for service providers is more dependent on the size of the population. In addition, differences in treatment standards are likely to affect cost levels.

Tables 3 and 4 present the unit cost information in terms of properties served. This generates a quite different picture.

Table 3 Costs per property of water delivered (£/property)

Weighted averages (by turnover)	England & Wales	Australia	Netherlands	USA
Cost of Operations	65	59	71	142
Cost of Capital Maintenance	37	22	26	33
Return on Capital	43	42	22	132
Abstraction Tax	-	-	13	-
TOTAL COST	**145**	**123**	**133**	**307**

The per property comparisons for water indicate that the average household bill and components are roughly equivalent for all countries surveyed with the exception of the USA. To the extent that costs are not related to volume, for example customer service costs, this implies a similar level of absolute cost efficiency. The USA data suggests that the extremely high level of household demand is the main driver for the higher implied household bill.

Table 4 Costs per property for sewage collected (£/property)

Weighted averages (by turnover)	England & Wales	Australia	Netherlands*	USA*

Cost of Operations	49	61		
Cost of Capital Maintenance	42	29		
Return on Capital	75	47		
TOTAL COST	**166**	**138**		

*Only data for the water service is available for the Netherlands and USA.

The sewerage service comparisons in Table 4 generate similar results for England & Wales and Australia on average. Operating expenditure in England & Wales is lower and capital maintenance charges higher. However the relative performance of the assets in terms of the treatment provided is significant, with some enterprises in Australia providing a much lower level of treatment. The England & Wales figures for 1998-99 are also inflated by the high return on capital component. This will be reduced considerably following the 1999 Periodic Review as the efficiency gains made by companies over the last five years are passed on to customers.

Water delivered and leakage

Another important aspect of companies' performance is their effectiveness in managing the water balance. The unit costs presented above suggest that water delivered is an important cost driver and it is therefore important that accurate information is available on all components of the water balance. Table 5 below presents some of the key water balance data, though it is important to remember that the water balance is a complicated area to assess and there may be inconsistencies in the reported data.

Table 5 Water delivered, leakage and consumption

	England & Wales	Australia	Netherlands	USA
Distribution Input (l/prop/d)	654	1,078	453	2,271
Distribution losses (l/prop/d)	113	146	n/a	385
Estimated supply pipe leakage (l/prop/d)	41	n/a	n/a	n/a
Total leakage (l/prop/d)	154	n/a	n/a	n/a
Measured households consumption (l/head/d)	136	241	n/a	345
Unmeasured households consumption (l/head/d)	148	n/a	n/a	n/a
Household meter penetration	14%	100%	100%	100%

The most noticeable difference is the huge variation in the level of water consumption shown by the data. Per capita consumption in Australia is around 80% higher than England & Wales, whilst in the USA consumption is 2½ times higher. Greater use of water-intensive equipment such as swimming pools, air conditioning and garden use in a hotter drier climate may explain some of this difference

In terms of leakage levels, the main outlier is the USA where the reported figure is extremely high. Leakage figures reported in the Netherlands' are suspiciously low (in some cases zero) and are unlikely to be comparable. Whilst some of the difference may be explained by the use of low system pressures, it seems likely that there are some inaccuracies in the data and this data has therefore been omitted. Conversely the leakage rates in the USA may be a reflection of the higher pressure levels in distribution systems, which are required to support the rate of consumption.

Financial Ratios

Companies in England & Wales are privately owned (as are the USA companies sampled), and have to fund the payments of dividends to shareholders. In most other countries, the enterprises are state owned and rely largely on debt finance.

The accounting treatment of long lived assets when calculating depreciation varies. The UK and Australia tend to use current cost accounting where depreciation is calculated on the current replacement cost of assets. Other countries use the historic cost approach where assets are valued at their purchase price, regardless of how much time has passed and the associated inflation.

The valuation of the businesses for calculating the return on capital also varies. Countries using historic cost accounting also tend to use the total historic cost of the assets for this valuation.

In England & Wales, the first 200-day average of market capitalisation, plus debt less any cash injection was used as the basis for the initial capital value of the ten water and sewerage companies. For the water only companies the initial capital value was based on an assessed indicative value. For Australia, the data reported in the annual accounts relate to the current replacement cost of the assets.

Table 6 below seeks to examine some of these financial issues by looking at certain key ratios.

The table shows that capital value estimates vary quite markedly with the USA companies quoting a valuation per property for the water service only which is almost as high as the combined water and sewerage service for England & Wales. Estimates of current replacement cost also vary considerably, with companies in England & Wales citing a very high figure.

Table 6 Financial Indicators

	England & Wales	Australia	Netherlands	USA

Estimated Capital Employed (£/prop)				
Water service (£/prop)	-	-	481	1,130
Sewerage service (£/prop)	-	-	-	-
Water & Sewerage (£/prop)	1,153	n/a	-	-
Net replacement cost (MEA) (£/prop)				
Water & Sewerage (£/prop)	8,975	3,304	n/a	n/a
Historic Cost Dividend cover	0.9	n/a	No dividends	3.6
Current Cost Dividend cover	0.7	1.5	n/a	n/a
Dividend + Interest \ capital employed	11%	n/a	5%	6%
Historic Cost – Interest cover	4.7	4.2	1.3	3.8
Return on Capital (Estimated Capital Employed)	9.6%	n/a	6.2%	10.7%
Return on Capital (MEA)	1.3%	2.1%	n/a	n/a
Operating margin	36%	25%	22%	40%

Regarding dividends, both the Netherlands and some of the Australian businesses pay none. Dividends are high compared to profit levels in both England & Wales. This is also reflected in a comparison of dividend and interest payments relative to capital value. It will be interesting to see how this will change as a result of Ofwat's 1999 review of price limits.

Although dividends for the England & Wales companies appear high, neither the reported return on capital or operating margin appears to be out of line with the other private sector companies in the USA. However state owned enterprises appear to earn a lower profit margin. Again it will be interesting to see how this changes as a result of Ofwat's review of price limits.

Finally it is notable that levels of interest cover are much lower for the public sector companies in the Netherlands, which can support much lower levels of interest cover than would be tolerated by private sector lenders.

Conclusions

The preliminary study has highlighted a number of areas where useful comparisons can be drawn between the performance of the regulated water companies in England & Wales and their counterparts overseas. The preliminary results can be used on a selective basis however caution must be exercised if the data is used in support of regulatory decision making.

The study has identified some potential for robust comparisons between water enterprises, which would inform regulatory decisions as well as stimulate comparative competition between the regulated companies. However, further work would be needed to validate the information collected before we can be confident that the boundaries of fair comparisons can be extended outside England & Wales.

Table 7 Summary of information sources and other assumptions

	England & Wales	Australia	Netherlands	USA
Source of data	June Return 1999	Submission to Ofwat (Sydney Water) WSAA facts Annual Accounts	Arthur D Little benchmarking study for VEWIN Annual Accounts	NAWC Financial and operating data
Financial Year	4/98 – 3/99	7/98 – 6/99	1998 (calendar year)	1998 (calendar year)
Exchange rate Per £	-	AU$ 2.62	Fl 3.28	US$1.66

3. COMPARISONS OF PERFORMANCE
A1. SYDNEY WATER

Constitutional and Regulatory Framework

In Australia, water and sewerage services are provided by government-owned corporations. Economic regulation is carried out by regulatory authorities in each state. The framework used is RPI – X, similar to that in England & Wales. Each state also has competent bodies to regulate Drinking Water Standards and environmental concerns. However, unlike England & Wales, abstraction may be subject to a different regulatory agency than effluent discharges.

Data Sources

As in 1997-98 Sydney Water submitted data directly to Ofwat in the form of a slimmed-down June Return. This submission contains additional data to that available for the other Australian comparators in this report. In addition, though not independently audited this year, because Sydney Water used Ofwat's June Return definitions the data should be of a robust standard and we can be sure that the definitions coincide with those used by the companies in England & Wales. This has allowed Ofwat to carry out some additional analysis as well as some year on year analysis and the results of this are reported below. 1998-99 is the third year that Sydney Water has submitted data to Ofwat.

Results of analysis

The performance of Sydney Water has been compared to that of the England & Wales companies across five key areas:

- **Customer service levels**

Levels of customer service are broadly comparable, assessed on the basis of Ofwat's DG indicators. Performance is somewhat better on sewer flooding and meter reading and there have been slight improvements in most areas compared to that reported in 1997-98 but performance is significantly worse on telephone contact.

- **Water delivered, leakage and consumption**

Sydney Water reports very high levels of consumption compared to England & Wales as a result of higher levels of non-essential use. Leakage levels compare favourably to the England & Wales average, though Sydney Water report that supply pipe leakage is negligible or non-existent.

- **Unit cost comparisons**

Comparisons of volumetric unit costs are complicated by Sydney's high consumption levels, which mean that compared on this basis Sydney Water appears more efficient. On the basis of costs per property Sydney's costs are slightly higher than the England & Wales average for the Water Service and broadly the same for sewerage.

- **Capital expenditure**

Overall maintenance levels are very much lower than reported by the England & Wales companies, partly due to the contracting-out of this function. The one exception is for the sewerage network where particular operating problems exist. Comparisons of data on enhancement expenditure are of limited value due to the different prevailing standards but are lower than England & Wales for all categories of enhancement expenditure.

- **Financial performance**

Low estimates of the replacement cost of Sydney's assets lead to higher rates of return on capital compared to England & Wales. Both interest cover and operating margins are well below that reported by the England & Wales companies and indeed are lower than most of the other Australian companies in this report.

CUSTOMER SERVICE LEVELS

Table 8 below compares the customer service performance of Sydney Water with the England & Wales companies for both 1997-98 and 1998-99.

Table 8 Performance against DG levels of service indicators

		England & Wales average		England & Wales range		Sydney Water	
		1997-98	1998-99	1997-98	1998-99	1997-98	1998-99
DG2	Properties at risk of low pressure	0.25%	0.17%	0-3.38%	0-3.47%	0.34%	0.25%
DG3	Properties subject to unplanned supply interruptions						
	12 hours or more	0.15%	0.05%	0.01-0.10%	0-0.24%	0.05%	0.04%
	6 hours or more	0.53%	0.33%	0.01-1.39%	0-0.99%	0.42%	0.40%
DG4	Properties subject to hose-pipe bans	3.0%	3.0%	-	-	0%	0%
DG5	Properties subject to sewer flooding incidents	0.03%	0.02%	0.02-0.05%	0.01-0.03%	0.01%	0.01%
DG6	Billing contacts not responded to within 5 working days	4.7%	2.5%	0.3-18.3%	0-6.0%	n/a	n/a
DG7	Written complaints not responded to within 10 working days	2.0%	1.3%	0-9.1%	0-4.7%	1.0%	0.7%
DG8	Bills not based on meter readings (metered properties)	0.9%	0.3%	0-3.3%	0-1.0%	0.1%	<0.1%
DG9	Received telephone calls not answered within 30 seconds	19%	10%	2-53%	3-17%	39%	30.3%

DG2 Inadequate Pressure: Sydney Water is required to provide 15 metres head of pressure in the water main adjacent to the property – roughly equivalent to the standard for England & Wales – for 98% of households. Table 8 shows that Sydney Water has comfortably met this standard with performance very close to the average for England & Wales. Performance for both Sydney Water and the England & Wales companies has improved slightly over the year.

DG3 Supply Interruptions: Companies in England & Wales are required to report on both planned and unplanned interruptions. Where interruptions are planned this enables customers to be warned in advance. Where there is no warning, a short break in supply is considered tolerable but companies are required to report longer unplanned interruptions of 6,12 or 24 hours. Sydney Water's performance against both the 6-hour and 12-hour standard is broadly equivalent to the England & Wales average for 1998-99. Performance for both Sydney Water and the England &Wales companies has improved slightly since 1997-98.

DG 4 Hosepipe bans: Hosepipe bans are often used in the UK in times of lower than average rainfall but are then lifted when the resource position improves. Up to 39% of the England & Wales population have been covered by such restrictions in recent years though for 1998-99 only 3% of properties were affected. There were no restrictions in place in Sydney during either 1997-98 or 1998-99.

DG 5 Foul sewer flooding: The reliability of Sydney Water's sewerage system, in terms of preventing internal flooding is at least equivalent to that of the best in England & Wales. This is achieved by the installation of surcharge gullies placed before the first internal connection to the property so that in the event of an overflow the flooding is restricted to external areas. Such an approach may be a low cost way to deal with sewer flooding problems in England & Wales. In addition, Sydney Water's sewerage system generally separates wastewater and rainwater thus reducing the impact of high rainfall.

DG6 Billing contacts: Sydney Water does not monitor response times to billing queries in a formal way. Therefore no direct comparison can be made with companies in England & Wales.

DG7 Response to complaints: Although the data appears to show good performance by Sydney Water in this area, the nature and handling of complaints by Sydney Water is somewhat different to the approach in England & Wales, which limits the value of comparisons. Most complaints to Sydney Water are handled by the telephone and these are usually dealt with within 2 days. Responses to written complaints are often dealt with by a "holding" reply and the final resolution of the issue often takes longer. However there is a strong emphasis on customer satisfaction in Sydney Water's approach to handling complaints.

DG8 Meter reading: Over 98% of Sydney Water's properties are metered. Meters are usually read quarterly and a bill is sent to the customer. Meter reading is contracted out and this has led to a high standard of performance with less than 0.1% of meters being unread in 1998-99 compared to 0.3% in England & Wales.

DG9 Telephone Contact: Whilst the performance of Sydney Water on this measure has improved, it continues to lag behind the England & Wales companies. However, Sydney Water has taken great steps to improve its customer contact, opening two new call centres in

1997-98 and introducing new technology to improve the service, including the capability to respond to customer queries 24 hours a day via e-mail.

VOLUME OF WATER DELIVERED AND LEAKAGE

Table 9 below sets out the key parameters for water use. This assessment is important both in terms of assessing relative efficiency and whether or not the company is using its water resources effectively.

Table 9 Water delivered, leakage and consumption

	England & Wales average		Sydney Water	
	1997-98	1998-99	1997-98	1998-99
Distribution input (l/prop/day)	685	654	1,207	1,144
Distribution losses (l/prop/day)	129	113	138	138
Supply pipe leakage (l/prop/day)	45	41	0	0
Total leakage (l/prop/day)	174	154	138	138
Proportion of water delivered to non-households	32%	32%	35%	36%
Measured household consumption (l/head/day)	138	136	269	249
Unmeasured households consumption (l/head /day)	150	148	214	-
Average household consumption (l/head/day)	149	146	269	249

The most obvious difference is that Sydney Water's per capita consumption is much higher than in England & Wales. The differences in water use relate to a higher non-essential use for garden watering and inefficient use of water by customers. Sydney Water now has a Demand Management Strategy in place and must aim to reduce consumption by 25% by 2005 and a further 10% by 2010.

Leakage is estimated as a residual rather than being directly assessed as it is in England & Wales. However, near-universal metering means that this approach yields data that is probably as accurate as that collected by the England & Wales companies. Any water lost on the customer's side of the meter is deemed to be consumption and not included in leakage figures. Sydney Water believes such losses are minimal for the simple reason that the customer must pay for them. Even if this is true, total leakage measured in absolute terms rose from 192 Ml/d in 1997-98 to 196 Ml/d in 1998-99 (increases in the number of connected properties counterbalance this rise). This is in contrast to England & Wales where, due to the setting of mandatory leakage targets, reductions have been recorded for nearly all companies each year since 1996-97.

OPERATING EXPENDITURE

Unit cost comparisons

Tables 10 and 11 below set out a simple analysis of unit operating and capital maintenance costs and compare these against the range seen in England & Wales. Unit cost comparisons provide a simple indicator of relative cost performance.

Table 10. Costs per unit of water delivered (p/m^3)

WATER	England & Wales average	England & Wales range**	Sydney Water*
Cost of operations	**32**	**25-52**	**25 (20)**
Resources and treatment	*10*	*6 – 18*	*10 (5)*
Distribution	*11*	*7 – 20*	*10 (10)*
Business activity	*10*	*7 – 14*	*5 (5)*
Cost of capital maintenance	**18**	**9-26**	**5 (7)**
Return on Capital	**21**	**9-49**	**6 (9)**
TOTAL COST	**71**	**50-126**	**36**

Note. Data for the England & Wales Range column is not additive.
* Data in brackets for Sydney is after adjustment to reflect the contracting out of water treatment in a Build Operate and Own arrangement

Table 11. Costs per unit of sewage collected (p/m^3)

SEWERAGE	England & Wales average	England & Wales range	Sydney Water
Cost of operations	**28**	**22-39**	**35**
Sewerage	*5*	*4 – 10*	*13*
Sewage treatment	*9*	*7 – 16*	*14*
Sludge disposal	*5*	*3 – 7*	*4*
Business activity	*8*	*7 – 12*	*4*
Cost of capital maintenance	**24**	**15-36**	**15**
Return on Capital	**43**	**28-97**	**7**
TOTAL COST	**95**	**66-165**	**57**

Note. Data for the England & Wales Range column is not additive.

Table 10 shows that total unit costs for Sydney Water in terms of p/m^3 for water delivered are much lower than the average for England & Wales. Sydney Water has contracted out the operation and maintenance of its treatment works and this is included in its operating costs. However, since the arrangement includes provision for renewal of capital equipment operating costs are likely to be somewhat overstated and capital maintenance understated in the analysis above.

For sewerage, Sydney Water's total operating and capital maintenance costs are similar to the England & Wales average with operating costs being relatively higher and capital maintenance lower. The return on capital is much lower leading to lower overall total costs.

However, as noted earlier, much higher relative consumption levels mean water delivered may not be the best denominator. Where economies of scale are likely to exist – in water distribution and customer services – a more equitable comparison would use a property or population denominator.

Tables 12 and 13 set out the same unit cost comparisons in per property terms. On these comparisons Sydney Water appears relatively less efficient. For the water service the cost per property is much higher than the average for England & Wales. For the sewerage service whilst its total costs are just below the average for England & Wales this is only due to the much lower return on capital element. For both services the cost of operating underground networks (sewerage and water distribution) appear particularly high.

Table 12 Costs per property of water delivered (£/ property)

WATER	England & Wales average	England & Wales Range	Sydney Water*
Cost of Operations	**65**	**50 – 89**	**90 (74)**
Resources and Treatment	*21*	*12 – 41*	*37 (21)*
Distribution	*23*	*16 – 37*	*37 (37)*
Business Activity	*21*	*15 – 31*	*16 (16)*
Cost of Capital Maintenance	**37**	**18 – 53**	**19 (25)**
Return on Capital	**43**	**18 – 68**	**21 (31)**
TOTAL COST	**145**	**99 – 179**	**130**

Note. Data for the England & Wales Range column is not additive.
* Data in brackets for Sydney is after adjustment to reflect the contracting out of water treatment in a Build Operate and Own arrangement.

Table 13 Costs per property for sewage collected (£/ prop)

SEWERAGE	England & Wales average	England & Wales Range*	Sydney Water
Cost of operations	**49**	**39 – 62**	**91**
Sewerage	*10*	*6 – 17*	*33*
Sewage treatment	*16*	*12 – 25*	*35*
Sludge disposal	*9*	*6 – 12*	*11*
Business activity	*14*	*12 – 19*	*11*
Cost of capital maintenance	**42**	**30 - 63**	**38**
Return on Capital	**75**	**55 – 152**	**18**
TOTAL COST	**166**	**127 - 260**	**147**

Note. Data for the England & Wales Range column is not additive.

These comparisons do not take into account factors relating to the operating environment, which might increase or reduce costs relative to other businesses. Ofwat uses statistical techniques to identify the cost implications of different operating environments in England & Wales. Insufficient data was available to run the 1998-99 models for Sydney Water, but the results obtained for 1997-98 are shown in Tables 14 and 15 below.

Table 14. Actual expenditure relative to that predicted by models

WATER	1997-98 results	Explanatory factors
Resources & Treatment	Around expected	Population, proportion of total mains length with diameter >300mm

Distribution	Well above expected	Population, no. of sources, DI, proportion of supplies from rivers
Power	Well above expected	DI, Average pumping head
Business Activity	Around expected	No. of billed properties
TOTAL COSTS	Around expected	-

Table 15. Actual expenditure relative to that predicted by models – Sewerage service

SEWERAGE	1997-98 results	Explanatory factors
Sewerage	Above 2x expected	Sewer length, area, resident population, holiday population
Sewage treatment – large works	Above 2x expected	Total load, use of biological treatment, use of activated sludge, tight effluent standard for suspended solids and BOD
Sewage treatment – small works	Above expected	Works size, works type, load
Sludge disposal	Above 2x expected	Weight of dry solids, disposal route
Business Activity	Well above expected	No. of billed properties
TOTAL COSTS	Above 2x expected	-

CAPITAL EXPENDITURE

Tables 16 and 17 set out the level of capital expenditure per property, separated between ongoing capital maintenance and expenditure directed at meeting improved standards of service (including those imposed by quality regulators). For Sydney Water, data for 1997-98 and 1998-99 is compared to the England & Wales average for 1995-96 to 1998-99. To a large extent the differences are likely to reflect legislative and other pressures on service providers to improve rather than efficiency.

For the water service asset maintenance is significantly higher for the England & Wales companies than for Sydney Water. Part of the reason for the low level of maintenance for water resources and treatment is the externalisation of operations and maintenance of treatment works. This means that no capital maintenance is required on these assets.

Table 16. Annual capital expenditure per property by sub service area

WATER	1995-99 average		1997-98	1998-99
	England & Wales average	England & Wales range	Sydney Water	Sydney Water

Water resources & treatment	**17.1**	**3.8 – 42.3**	**2.4**	**4.9**
Maintenance	*7.8*	*1.7 - 19.6*	*1.4*	*0.03*
Enhancement	*9.3*	*0.1 – 25.4*	*1.0*	*4.8*
Water distribution	**39.8**	**10.1 – 59.6**	**8.2**	**10.7**
Maintenance	*14.4*	*3.7 – 21.5*	*7.7*	*7.3*
Enhancement	*25.3*	*5.4 – 45.0*	*0.5*	*3.4*
Management and general	**8.4**	**2.2 - 14.7**	**4.4**	**4.8**
WATER TOTAL	**65.3**	**28.3 – 90.6**	**15.1**	**20.3**

Expenditure on the distribution system is also far lower for Sydney Water than for the England & Wales companies, partly because Sydney Water has very few remaining unlined iron mains as a result of a rehabilitation programme in the 1960s. The discolouration problems experienced in England & Wales have not occurred to the same extent.

Table 17. Annual capital expenditure per property by sub-service area

	1995-98 average		1997-98	1998-99
SEWERAGE	**England & Wales average**	**England & Wales range**	**Sydney Water**	**Sydney Water**
Sewerage network	**30.6**	**12.9 – 58.5**	**32.2**	**26.0**
Maintenance	*10.4*	*6.1 – 16.5*	*17.5*	*19.1*
Enhancement	*20.1*	*6.8 – 48.1*	*14.7*	*6.9*
Sewage treatment & sludge treatment and disposal	**38.1**	**23.9 – 58.0**	**11.9**	**3.4**
Maintenance	*10.6*	*5.3 – 15.5*	*6.0*	*0.9*
Enhancement	*27.6*	*15.1 – 48.3*	*5.9*	*2.5*
Management and general	**7.4**	**3.9 – 10.3**	**2.2**	**2.0**
SEWERAGE TOTAL	**76.0**	**43.1 – 121.4**	**46.3**	**31.4**

For the sewerage service, Sydney Water again has lower total expenditure and has reported a significant fall compared to 1997-98, particularly for sewage treatment and sludge disposal. This is due to the high level of treatment of sewage and sludge required to meet new quality obligations in England & Wales.

Maintenance expenditure is at a similar level overall to the England & Wales average but with the focus on the sewerage network. There is less expenditure on improving the quality of effluent, an important cost driver in England & Wales. However, Sydney Water's expenditure on quality is expected to increase significantly to meet anticipated environmental standards.

Network Activity

Network activity measures provide a good indication of the performance of assets. Annual data provides a snapshot view of performance, which then needs to be viewed against longer-term trends. Tables 18 and 19 compare network activity rates for Sydney Water in 1997-98 and 1998-99 against the long term (1990-99) average for England & Wales. It also shows burst and collapse rates for water mains and sewers respectively.

Table 18. Network Activity – Water service

	1990-99 average		1997-98	1998-99
	England & Wales average	England & Wales range	Sydney Water	Sydney Water
% of total mains length				
Renewed	0.9%	0.1 - 1.5%	0.2%	0.2%
Relined	0.6%	<0.1 - 1.8%	0.0%	0.0%
Total Activity				
% communication pipes replaced			0.04%	
Mains Bursts per 000km	213	123 – 346	487	435

Table 19. Network Activity – Sewage service

	1990-99 average		1997-98	1998-99
	England & Wales average	England & Wales range	Sydney Water	Sydney Water
% of total critical sewer length				
Renovated	0.18%	0.05 - 0.51%	0.23%	0.47%
Replaced	0.14%	0.03 - 0.46%	0%	0%
Total Activity	0.31%	0.08 - 0.61%	0.23%	0.47%
Sewer Collapses per 000km	20	5 – 41	24	49

As the tables show, infrastructure activity levels are considerably higher in England & Wales than for Sydney Water. This is particularly true for the water service due to the comprehensive mains rehabilitation programme currently underway in England & Wales.

Perhaps as a result, burst rates for Sydney Water's water mains are high by England & Wales standards although further investigation would be needed to properly understand the reasons. For sewers the picture for Sydney Water is at the higher end of the data for England & Wales both in terms of renewal rates and the incidence of collapses. A major cause is the influence of tree roots on the sewerage system.

FINANCIAL PERFORMANCE

Table 20 below summarises some key financial indicators. Note that Australian accounts are prepared on a current cost basis.

Table 20. Financial Ratios

	England & Wales total		England & Wales range		Sydney Water	Sydney Water
	1997-98	1998-99	1997-98	1998-99	1997-98	1998-99
Net Replacement Cost (MEA) (£/prop)	8,931*	8,975*	7,382 - 11,524*	7,494 - 11,560*	3,879	3,092
Current Cost Dividend cover	0.7	0.7	0 - 3.7	0.1 - 2.8	0.6	0.2
Dividend + Interest \ capital employed	11%	11%	4 – 21%	5 - 52%	10%	2%
Current Cost Interest cover	5.9	3.8	3.9 - 20.1	2.1 - 10.6	1.8	1.7
Return on Capital (MEA)	1.2%	1.3%	0.8 -2.8%	0.8 -2.6%	2.7%	2.3%
Operating margin	36%	36%	15 - 49%	19 - 49%	46%	26%

* Water and Sewerage Companies only

Sydney Water's estimate of the gross Modern Equivalent Asset (MEA) value for replacing its assets is very low compared to the England & Wales companies', given the length of mains and sewers being considered. This may be due to smaller pipe size profile or, more likely, different assumptions on the unit cost of replacement. The lower MEA values explain the relatively high rate of return on capital.

Interest cover fell significantly in 1998-99 to the lower end of the range in England & Wales and operating margins were also well below that reported by the England & Wales companies (and indeed are much lower than the other Australian companies in this report). This is partly due to costs incurred in 1998-99 associated with water quality incidents.

A2 OTHER AUSTRALIAN COMPANIES

Data Sources

There were two main sources of data for the Australian water and sewerage providers reviewed in the section. *WSAAfacts* is an annual publication produced by the Water Services Association of Australia. It covers most aspects of company performance that are reviewed by Ofwat. Data is submitted by members for their metropolitan operations. This study considers the information available on the enterprises serving the largest cities. Generally the data for metropolitan areas has been separated from that covering the empty hinterland areas as in *WSAAfacts*. However, the section on financial indicators covers the entire business, which for some companies includes these areas.

In addition to this publication, the Annual Reports for each corporation have been used to check for consistency and extract useful financial information that is not included in *WSAAfacts*.

Table 21 Company Acronyms

Acronym used in tables in this report	Company name	Urban area served
BRB	Brisbane Water	Brisbane, Queensland
CW	CityWest Water	Melbourne, Victoria
GC	Gold Coast Water	Gold Coast, Queensland
SAW	South Australia Water Corporation	Adelaide, South Australia
SEW	South East Water Limited	Melbourne, Victoria
WCWA	Water Corporation	Perth, Western Australia
YVW	Yarra Valley Water	Melbourne, Victoria

Characteristics of the Companies

Table 22 below sets out some key size information and compares this with a number of the England & Wales companies. The seven Australian companies reviewed in this section range in size from a fairly large water and sewerage company (WaSC) such as Water Corporation with 1.5 million customers, to smaller ones such as City West Water in Melbourne, which is smaller than all the England & Wales WaSCs.

Table 22 Comparison of Base Data with some England & Wales Companies

	Properties connected (000s)		Population served (000s)		Volume (Mld)		Network length (000 km)		Turnover £m
	Water	Sewerage	Water	Sewerage	Water delivered	Sewage collected	Water	Sewerage	Total
BRB	346	344	837	837	398	325	5.8	6.3	114
CW	248	242	548	548	246	280	3.5	3.0	66
GC	182	171	391	391	164	132	2.6	2.5	48
SAW	449	427	1045	1,025	271	246	8.3	6.7	128
SEW	519	480	1200	1,200	360	309	7.7	6.8	94
WCWA	590	488	1367	1,205	448	254	11.3	7.7	165
YVW	566	543	1545	1,545	331	349	8.4	7.8	110
Southern	984	1,739	2,219	4,416	520	813	13.3	20.7	433
South West	702	625	1,509	1,547	366	260	14.8	8.5	266
Wessex	513	1,038	1,172	2,479	304	480	11.1	15.3	265
Thames	3,398	5,222	7,634	12,423	1,892	2,655	31.5	77.8	1,071

Table 23 Comparison of Operating Environment with England & Wales average

	Population per connection (Water)	H/H meter penetration (%)	Climate indicators			Length of main per property (m)		Network Performance (per 000km)	
			Annual Rainfall (mm)	Average Temp. (oC)					
				Min.	Max.	Water	Sewerage	Mains bursts	Sewer collapse
BRB	2.4	100%	1,573	16.0	25.0	16.9	18.3	667	n/a
CW	2.2	100%	570	11.5	20.7	13.9	12.3	770	n/a
GC	2.1	100%	1,319	17.9	23.5	14.2	14.9	137	n/a
SAW	2.3	100%	578	12.2	22.2	18.6	15.7	315	n/a
SEW	2.3	100%	570	11.5	20.7	14.8	14.9	241	n/a
WCWA	2.3	100%	709	13.2	24.4	19.2	15.8	112	n/a
YVW	2.7	100%	570	11.5	20.7	14.8	14.4	420	n/a
England & Wales Average	2.3	14%	1,057	n/a	n/a	14.2	14.3	164	16
England & Wales Lowest	2.1	1%	-	-	-	9.3	11.9	86	5
England & Wales Highest	2.5	38%	-	-	-	21.6	15.6	242	42

Table 23 highlights some differences in operating environment. As well as the obvious difference in climate, there is virtually universal metering in Australia. As the data covers only urban areas, density of connection is not much different to the England & Wales average. Cities in Australia tend to be low-density suburban sprawl with large gardens compared to those in England & Wales.

Data on bursts and collapses seems to suggest that underground networks are in worse condition than those in England & Wales. However the differences may be due to different definitions. This is suggested by the wide variation between the Australian areas.

CUSTOMER SERVICE LEVELS

Although the information on customer service levels is limited it suggests a similar performance to England & Wales for interruption frequency. Sewer flooding is apparently higher, but many of these may be external flooding incidents. Properties in Australia have specially designed gullies to capture any backflows associated with inadequate sewer capacity.

Table 24 Customer Service Indicators

	England &Wales			BRB	CW	GC	SAW	SEW	WCWA	YVW
	Lowest	Highest	Average							
Unplanned interruptions >6 hrs (% props affected)	<0.01	0.99	0.33	0.71	0.84	0.10	n/a	0.44	n/a	0.32
Sewer flooding incidence (per 100,000 properties)	11	35	23	32	124	n/a	404	71	n/a	133

Table 25 below shows that for most areas, secondary treatment is the norm. Notable exceptions are Yarra Valley (YVW) where all discharges have tertiary treatment and Water Corporation (WCWA), where 39% of discharges are subject to primary treatment only. The volume of wastewater returned per property is significantly higher than even the highest figure for England & Wales.

Table 25 Environmental Performance and Sewage Volumes

	England & Wales			BRB	CW	GC	SAW	SEW	WCWA	YVW
	Lowest	Highest	Average							
Proportion of treatment										
Primary only	0%	53%	15%	0%	0%	0%	0%	0%	39%	0%
Secondary	30%	78%	62%	63%	100%	89%	100%	93%	61%	0%
Tertiary	3%	41%	23%	37%	0%	11%	0%	7%	0%	100%
Volume of waste water returned (l/prop/d)	406	496	452	945	1156	772	577	643	520	643
Ratio of waste water returned to water delivered	85%	102%	92%	82%	116%	86%	96%	93%	68%	110%

VOLUME OF WATER DELIVERED AND LEAKAGE

Table 26 below sets out the key parameters for water use. This assessment is important both in terms of assessing relative efficiency and whether or not the company is using its water resources effectively.

Table 26 Water delivered, leakage and consumption

	England &Wales			BRB	CW	GC	SAW	SEW	WCWA	YVW
	Lowest	Highest	Average							
Distribution Input (l/prop/day)	434	838	654	1,156	1,377	901	1,129	893	1,045	943
Distribution Losses (l/prop/day)	57	191	113	n/a	192	n/a	162	57	100	n/a
Est. supply Pipe leakage (l/prop/day)	14	54	41	-	-	-	-	-	-	-
Total Leakage (l/prop/day)	80	238	154	-	-	-	-	-	-	-
Proportion of water delivered to Non H/H	20%	47%	32%	35%	52%	83%	14%	30%	17%	20%
Measured H/H Consumption (l/head/d)	114	150	136	309	256	n/a	297	236	309	223
Unmeasured H/H Consumption (l/head/d)	125	169	148	-	-	-	-	-	-	-
H/H water Delivered/ Population (l/head/d)*	126	185	158	309	256	n/a	297	236	309	223

*includes supply pipe leakage

Generally there is higher consumption of water throughout Australia with some regional variations, with consumption for Brisbane (BRB) being particularly high, probably as a result of the higher temperatures and / or the significant holiday population.

Leakage appears to be similar to levels in England & Wales. The exceptions are South East Water (SEW) and Water Corporation where estimates are rather lower than the England & Wales average, though still higher than the best performer in England & Wales. Estimates of supply pipe leakage are not available.

UNIT COST COMPARISONS

Water Service

Table 27 below sets out the main components for the water service of the unit cost of water delivered.

Table 27 Cost per unit of water delivered (p/m^3)

	England & Wales			BRB	CW	GC	SAW	SEW	WCWA	YVW
	Lowest	Highest	Average							
Cost of operations	25	52	32	15	9	11	21	10	17	15
Cost of capital maintenance	9	26	18	9	3	8	9	5	12	8
Return on capital	9	49	21	17	21	18	19	15	14	21
TOTAL COST	**50**	**126**	**71**	**41**	**33**	**38**	**49**	**31**	**43**	**44**

Note. Data for the 'Lowest' and 'Highest' columns is not additive.

The results demonstrate that the high level of water used per capita generates very low unit costs. Both operating costs and capital maintenance are lower than the England & Wales average for all the Australian companies considered. It appears that even the lowest cost companies in England & Wales cannot supply water at such low volumetric rates as the highest cost Australian comparator.

Capital maintenance costs are particularly low due to the greater use of outsourcing to supplier companies. For example in Melbourne, a separate company provides all treated water to the three "retailers" (City West, South East and Yarra Valley). The effect of this is to inflate operating costs and reduce capital maintenance. The return on capital component in Australia is very similar to England & Wales.

Of course, these comparisons do not take account of the operating environment, level of treatment required, or scale economies. To the extent that economies of scale exist, the costs in Australia are bound to be lower since the volume of water delivered will have little effect on customer service and, assuming there are no supply constraints, the distribution costs.

[INSERT GRAPHS]

Table 28 Cost per property of water delivered (£/property)

	England & Wales			BRB	CW	GC	SAW	SEW	WCWA	YVW
	Lowest	Highest	Average							
Cost of operations	50	89	65	63	37	37	61	29	55	33
Cost of capital maintenance	18	53	37	37	15	27	28	15	38	17
Return on capital	18	68	43	73	92	60	55	44	43	47
TOTAL COST	**99**	**179**	**145**	**173**	**144**	**124**	**144**	**88**	**135**	**97**

Note. Data for the 'Lowest' and 'Highest' columns is not additive.

When expressed in per property terms as in Table 28 the comparison is far closer with the England & Wales average lying within the range of the Australian companies. However there are still some notable outliers such as South East Water and Yarra Valley (both serving Melbourne) where total costs are below the levels reported by even the lowest cost companies in England & Wales, despite relatively high returns on capital.

Sewerage service

Tables 29 and 30 below make the same comparisons for the sewerage service. As with water, the higher volumes passing through the network in Australia lead to lower estimates of the costs of the service in volumetric terms. However for sewerage, volume is probably less appropriate as a cost driver with factors such as the level of treatment required, the size of the sewer network and the total pollution load all affecting costs.

Table 29 Cost per unit of sewage collected (p/m^3)

	England & Wales			BRB	CW	GC	SAW	SEW	WCWA	YVW
	Lowest	Highest	Average							
Cost of operations	22	39	28	14	15	18	17	21	25	17
Cost of capital maintenance	15	36	24	10	3	11	14	7	26	8
Return on capital	28	97	43	22	11	22	40	15	42	19
TOTAL COST	**66**	**165**	**95**	**45**	**29**	**52**	**70**	**43**	**92**	**43**

Note. Data for the 'Lowest' and 'Highest' columns is not additive.

The number of properties is probably a better denominator as this at least serves as a proxy for the amount of pollution generated. Table 30 below sets out this comparison.

[INSERT GRAPHS]

Table 30 Cost per property for sewage collected (£/property)

	England & Wales			BRB	CW	GC	SAW	SEW	WCWA	YVW
	Lowest	Highest	Average							
Cost of operations	39	62	49	49	62	51	36	49	47	40
Cost of capital maintenance	30	63	42	34	13	32	29	17	49	18
Return on capital	55	152	75	74	48	63	84	42	79	43
TOTAL COST	**127**	**260**	**166**	**157**	**123**	**146**	**148**	**102**	**175**	**102**

Note. Data for the 'Lowest' and 'Highest' columns is not additive.

These results show the England & Wales companies in a more favourable light, with low unit operating costs in particular which are matched by few of the Australian companies. Capital maintenance costs are however significantly higher. Once again South East Water and Yarra Valley's costs are below that of even the lowest cost England & Wales company.

FINANCIAL PERFORMANCE

Tables 31 below sets out some key financial ratios.

The accounts in Australia are presented on a current cost basis as in England & Wales and there are no comparable estimates of the capital value of the companies in terms of the purchase cost of the assets. The estimates for replacement costs produced by the Australian companies are however much lower in terms of amount per property served. Dividend levels (where paid) are roughly the same as in England & Wales compared to profit levels. The rate of profit compared to replacement cost and operating margins vary considerably. The return on capital for all companies is above that for England & Wales, largely as a result of the lower replacement cost estimates.

Table 31 Financial Ratios

	England & Wales			BRB	CW	GC	SAW	SEW	WCWA	YVW
	Lowest	Highest	Average							
Estimated Capital Employed (£/prop)	847	1,935	1,153	Not applicable						
Net replacement cost (MEA) (£/prop)	7,494*	11,560*	8,975*	2,751	1,311	2,152	2,961	1,058	3,656	1,148
Historic Cost Dividend cover	0.1	3.7	0.9	Not applicable						
Current Cost Dividend cover	0.1	2.8	0.7	n/a	1.0	n/a	0.6	0.3	0.8	0.2
Historic cost interest cover	3.1	12.2	4.7	Not applicable						
Current cost interest cover	2.1	10.6	3.8	3.7	5.3	13.3	3.2	2.2	11.1	1.8
Return on Capital (Estimated Capital Employed)	7.1%	17.3%	9.6%	Not applicable						
Return on Capital (MEA)	0.8%	2.6%	1.3%	4%	8%	6%	5%	3%	4 %	3%
Operating margin (%)	19%	49%	36%	34%	40%	53%	49%	19%	56%	20%

* Water and sewerage companies only

KEY CONCLUSIONS

- Comparisons of costs on the basis of volumes appear to show the Australian companies to be much more efficient than England & Wales. However these comparisons are distorted by the very high levels of consumption. This suggests that significant economies of scale exist, at least in terms of distribution and customer services.

- Comparisons based on the number of properties suggest that these differences in efficiency may in fact be illusory, with only South East and Yarra Valley reporting significantly different cost levels. However the differences in costs for these two companies would require further investigation to ascertain whether they are indicative of greater efficiency or can be explained by the operating environment.

- In general the financial indicators show broad comparability with England & Wales, though with significant variations between both the Australian companies and between the England & Wales companies. Only estimates of replacement costs show significant differences between the two countries.

B. THE NETHERLANDS

Constitutional and Regulatory framework

In the Netherlands, water services are mainly provided by eighteen similarly sized companies. These are owned by local and regional government bodies and represented by a trade association called VEWIN. The regional governments agree prices with the water providers on a regular basis although there does not appear to be a formal framework for price setting. The government has, however taken an interest in the water sector and the responsible Ministry has launched a compulsory benchmarking system so that comparisons can be made.

Data Sources

With this in mind, Andersen Consulting carried out a benchmarking exercise for VEWIN based on 1997 data. This section draws considerably on that report. The Andersen study was supplemented by the use of companies' published Annual reports for 1998. This allowed information to be updated and financial data to be used. The data used is on a calendar year basis for 1998. The Andersen report covered water quality, environment, customer satisfaction and costs. Only the cost data are shown in this report due to concerns about the comparability of data contained in the Andersen study. However the study suggests that there is little problem for the Dutch companies in meeting Drinking Water Directive standards

Table 32 Company Acronyms

Acronym used in tables in this report	Company name	Urban area served
DZH	Duinwaterbedrijf Zuid-Holland	South Holland
AMS	Gemeentewaterleidingen	Amsterdam
NHO	PWN Waterleidingbedrijf	North Holland
WG	Waterbedrijf Gelderland	Gelderland (Arnhem)
WML	Waterleiding Maatcshappij Limburg	Limburg (Maastricht)
WMN	Waterleidingbedrijf Midden-Nederland	Mid Netherlands (Utrecht)
WMO	Waterleiding Maatschappij Overrijssel	East Holland (Zwolle)
WOB	Waterleidingmaatschappij Oost-Brabant	East Brabant (Eindhoven)

Characteristics of the Companies

Table 33 sets out some key size information. The eight companies reviewed are generally similar in size to the larger water only companies in England & Wales.

Table 33 Comparison of Base Data with some England & Wales Companies

	Properties connected (000s)		Population served (000s)		Volume (Mld)		Network length (000 km)		Turnover £m
	Water	Sewerage	Water	Sewerage	Water delivered	Sewerage	Water	Sewerage	Total
DZH	533		1,131		188		3.7		83
AMS	412		n/a		181		2.1		66
NHO	670		n/a		270		9.2		99
WG	491		n/a		219		12.7		61
WML	453		n/a		202		7.4		68
WMN	503		n/a		215		5.7		47
WMO	472		n/a		211		11.2		61
WOB	571		1,366		275		10.6		63
South West	702		1,509		366		14.8		266
Wessex	513		1,172		304		11.1		265
Essex & Suffolk	748		1,680		431		8.4		115
North Surrey	197		478		114		2.5		32

Table 34 below reviews some of the wider characteristics of the companies in terms of population density and raw water sources.

Table 34 Comparison of Operating Environment with England & Wales

	Population per connection (water)	H/H meter penetration (%)	Ground or Surface Water	Length of main per property (m)	
				Water	Sewerage
DZH	2.1	100%	Surface	6.9	
AMS	-	100%	Surface	5.1	
NHO	-	100%	Surface	13.7	
WG	-	100%	Ground	25.9	
WML	-	100%	Ground	16.2	
WMN	-	100%	Ground	11.3	
WMO	-	100%	Ground	23.8	
WOB	2.4	100%	Ground	18.6	
E &W Average	2.3	14%	Mixture	14.2	
E & W Lowest	2.1	1%	-	9.3	
E & W Highest	2.5	38%	-	21.6	

Clearly there are many similarities between operating conditions in the Netherlands and England & Wales. In particular the climate is generally not dissimilar to that of England &

Wales. However there are some differences in terms of connection density. Urban areas such as Amsterdam (AMS) and South Holland (DZH) have a very high connection: network length ratio. Others such as Gelderland (WG) are more sparsely populated. Information on population and occupancy levels is not generally available.

CUSTOMER SERVICE LEVELS

Little information is available on the level of customer service provided by the Dutch companies. The Andersen study considers customer satisfaction as recorded in surveys which is not comparable with the information available for England & Wales. Whilst these surveys report that 90% of customers are satisfied or very satisfied with service levels, the Andersen report notes that translation of customer standards into service guarantees is limited or non-existent at water supply companies in the Netherlands. Water quality appears to be consistent with EU guidance with compliance between 94% and 99.9%.

VOLUME OF WATER DELIVERED AND LEAKAGE

Table 35 below sets out the key parameters for water use. This assessment is important in terms of assessing efficiency and whether the company is using its water resources effectively.

Table 35 Water delivered, leakage and consumption

	England &Wales			DZH	AMS	NHO	WG	WML	WMN	WMO	WOB
	Lowest	Highest	Average								
Distribution Input (l/prop/d)	434	838	654	370	456	411	482	500	427	475	522
Distribution Losses (l/prop/d)	57	191	113	-	-	-	-	-	-	-	-
Est. supply pipe leakage (l/prop/d)	14	54	41	-	-	-	-	-	-	-	-
Total Leakage (l/prop/d)	80	238	154	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Proportion of water delivered to Non H/H	20%	47%	32%	-	35%	20%	6%	-	-	-	40%
H/H Water Delivered/ Population (l/head/d) *	126	185	158	-	-	-	-	-	-	-	120

*includes supply pipe leakage

Broadly speaking, water balance data is comparable to that for England & Wales but with slightly lower levels of distribution input reported, perhaps as a result of near-universal metering. All of the Dutch companies reported very low levels of leakage (in some cases zero). This data has not been included since it is unlikely to be well founded and actual leakage is probably a good deal higher than reported.

Nonetheless, water abstraction is highly taxed in the Netherlands and this, as well as lower operating pressures facilitated by the flat terrain, will lead to lower economic levels of leakage than in England & Wales, where abstraction charges are set on a cost recovery basis by the Environment Agency.

UNIT COST COMPARISONS

Table 36 reviews volumetric unit costs for each of the main components of customers' bills. As in the Andersen report, the taxation element relating to abstraction has been separated from the analysis. The information in companies' Annual Reports for 1998 has been used to update the Andersen benchmarking study. In most cases the results are not significantly different, although turnover, in particular is rather higher than the figures implied by the 1997 study.

Table 36 Costs per unit of water delivered (p/m^3)

	England & Wales			DZH	AMS	NHO	WG	WML	WMN	WMO	WOB
	Lowest	Highest	Average								
Cost of operations	25	52	32	57	61	57	49	39	33	39	33
Abstraction Charge	-	-	-	5	2	3	11	11	12	11	11
Cost of capital maintenance	9	26	18	24	19	25	12	14	9	17	12
Return on capital	9	49	21	36	18	15	4	28	5	12	7
TOTAL COST	50	126	71	122	100	101	76	91	59	79	63

Note. Data for the 'Lowest' and 'Highest' columns is not additive.

Generally the analysis shows cost levels which are at the upper end of the range reported in England & Wales. The lowest cost companies, such as Middle Netherlands (WMN) and East Brabant (WOB), have total costs which are close to the lowest of the England & Wales companies. However these costs include very low returns on the capital employed, suggesting that there may be some form of subsidies involved.

Taking just operating costs and capital maintenance, and making allowance for the higher abstraction charges, only the Middle Netherlands' costs suggest levels of efficiency equivalent to the best in England & Wales. However as already noted it is difficult to draw any firm conclusions without taking into account the operating environment. The lowest cost companies in the Netherlands are almost exclusively served by ground water, which tends to be lower cost in terms of treatment. The three companies with the highest costs are those served by surface water.

Table 37 Costs per property of water delivered (£/property)

	England & Wales			DZH	AMS	NHO	WG	WML	WMN	WMO	WOB
	Lowest	Highest	Average								

Cost of operations	50	89	65	73	97	84	80	64	52	64	57
Abstraction Charge	-	-	-	6	3	4	18	17	19	17	20
Cost of capital maintenance	18	53	37	31	31	37	19	22	15	27	21
Return on capital	18	68	43	46	28	22	6	45	7	20	12
TOTAL COST	99	179	145	157	160	148	123	149	93	129	110

Note. Data for the ‘Lowest’ and ‘Highest’ columns is not additive.

The comparison based on costs per property gives a somewhat different result to the volumetric comparisons in that the Dutch companies perform better. This will be partly due to the lower consumption levels reported earlier. There may also be differences in the rate of occupancy, which could affect the results. Again costs for Middle Netherlands are the lowest amongst the Dutch companies.

[INSERT GRAPHS]

FINANCIAL PERFORMANCE

Some key financial indicators are set out in table 38 below. The Netherlands companies' accounts are prepared on a historic cost basis and this is reflected in depreciation and the capital value recorded.

Table 38 Financial Ratios

	England & Wales			DZH	AMS	NHO	WG	WML	WMN	WMO	WOB
	Lowest	Highest	Average								
Estimated Capital Employed											
Water Service (£/prop)	-	-	-	594	403	721	371	558	273	343	322
Sewerage Service (£/prop)	-	-	-	-	-	-	-	-	-	-	-
Water & Sewerage (£/prop)	847*	1,935*	1,153*	-	-	-	-	-	-	-	-
Net replacement cost (MEA) (£/prop)	7,494*	11,560*	8,975*	Not applicable in the Netherlands							
Historic cost dividend cover	0.1	3.7	0.9	No dividends paid by Netherlands suppliers							
Dividend + Interest / capital employed	5%	52%	11%	8%	6%	3%	4%	4%	4%	5%	5%
Historic cost interest cover	3.1	12.2	4.7	1.3	1.4	1.4	0.8	1.9	1.0	1.2	1.1
Current cost interest cover	2.1	10.6	3.8	Not applicable in the Netherlands							
Return on Capital (Estimated Capital Employed)	7.1%	17.3%	9.6%	10%	9%	4%	3%	9%	4%	6%	5%
Return on Capital (MEA)	0.8%	2.6%	1.3%	Not applicable in the Netherlands							
Operating margin (%)	19%	49%	36%	38%	22%	20%	8%	32%	11%	16%	15%

*Water and Sewerage companies only

Generally profit levels are much lower meaning interest cover, and the amounts distributed as return on capital (i.e. dividends and interest) are low compared to the high dividend environment in England & Wales. The Dutch companies are publicly owned and pay no dividends. The operating margin for most companies is also much lower than in England & Wales which might suggest that there are implicit subsidies built into the charging system.

KEY CONCLUSIONS

- The similarity of the base data reported in this chapter, suggests that the water suppliers in the Netherlands could provide Ofwat with some useful comparative data on water consumption and cost levels.

- Comparisons of unit costs suggest that the best performers in the Netherlands may be a match for the most efficient companies in England & Wales. Further work would be needed to verify whether or not this conclusion holds.

- Reported leakage levels in the Netherlands are extremely low. Whilst factors such as high abstraction charges (which mean that the lost water has greater value) and generally lower pressures mean that one would expect lower economic levels of leakage in the Netherlands, these estimates must be treated with considerable caution.

C. UNITED STATES OF AMERICA

Constitutional and Regulatory Framework

Water services in the USA are provided by a diverse and multitudinous set of enterprises ranging from local authorities, mutual bodies and publicly quoted companies. The privately owned concerns are members of a trade association, the National Association of Water Companies (NAWC). Each of these companies is relatively small, none being larger than a big water only company in England & Wales. A number of these private companies have been acquired by undertakers in England & Wales, including Yorkshire and Anglian Water.

Tribunals regulate prices in the USA. The calculations are generally done by fixing the rate of return that the company can earn on its assets. There is less emphasis on medium-term incentive-based regulation as used in England & Wales. Price reviews can be triggered by a complaint from either a customer, if they think bills are too high, or by the company if it feels returns are insufficient.

Data Sources

The NAWC publishes a set of annual operating and financial data from its members. The information in this section is largely based on the published information for 1998. Where possible information has been verified using the enterprises' published accounts.

Table 39 Company Acronyms

Acronym used in tables in this report	Company name	Urban area served
CAL	California Water Service Company	Various communities including East LA and South San Francisco
IND	Indianapolis Water Company	Indianapolis
NJ	New Jersey-American Water Company	Monmouth / Camden / Cape May / Hunterdon
PEN	Penn American	Various communities including Pittsburgh and Hershey
PH	Philadelphia Suburban Water Company	Philadelphia
SJ	San Jose Water Company	San Jose Metropolitan Area
SC	Southern California	Sacramento / Santa Barbara / LA
SLC	St Louis County Water Company	St Louis County / North of Jefferson County

Characteristics of the Companies

Table 40 sets out some key size information. The eight companies reviewed are the largest of the private water companies in the USA. However, even these are comparable only to medium to large-sized water only companies in England & Wales.

Table 40 Comparison of Base Data with some England & Wales Companies

	Properties connected (000s)		Population served (000s)		Volume (Mld) of		Network length (000 km)		Turnover £m
	Water	Sewerage	Water	Sewerage	Water delivered	Sewage collected	Water	Sewerage	Total
CAL	381		1,500		762		7.5		112
IND	250		839		419		5.2		50
NJ	331		878		485		7.4		140
PEN	535		2,000		528		12.2		170
PH	304		1,000		343		5.7		89
SJ	214		971		462		3.9		63
SC	243		1,054		569		4.5		81
SLC	305		991		492		6.5		61
Essex & Suffolk	748		1,680		431		8.4		115
North Surrey	197		478		114		2.5		32
South West	702		1,509		366		14.8		266
Wessex	513		1,172		304		11.1		265

Table 41 compares some of the wider characteristics of the companies in terms of population density.

Table 41 Comparison of Operating Environment with England & Wales

	Population per connection (water)	H/H meter penetration (%)	Length of main per property (m)	
			Water	Sewerage
CAL	3.9	100%	19.6	
IND	3.4	100%	20.6	
NJ	2.6	100%	22.3	
PEN	3.7	100%	22.8	
PH	3.3	100%	18.6	
SJ	4.5	100%	18.1	
SC	4.3	100%	18.4	
SLC	3.3	100%	21.2	
E & W Average	2.3	14%	14.2	
E & W Lowest	2.1	1%	9.3	
E & W Highest	2.5	38%	21.6	

Clearly there are considerable differences in the operating environment for a number of the USA companies. Hotter and drier climates in the areas served by a number of the companies, combined with higher living standards appear to lead to higher consumption levels. The population is more sparsely distributed with a higher occupation rate per property, which suggests that a number of dwellings are served by the same connection. Metering is thought to be universal.

CUSTOMER SERVICE LEVELS

No data is reported on the service provided to customers.

VOLUME OF WATER DELIVERED AND LEAKAGE

Table 42 below sets out the key parameters for water use. This assessment is important in terms of assessing efficiency and whether the company is using its water resources effectively.

Table 42 Water delivered, leakage and consumption

	England &Wales			CAL	IND	NJ	PEN	PH	SJ	SC	SLC
	Lowest	Highest	Average								
Distribution Input (l/prop/d)	434	838	654	2,704	2,203	1,643	1,349	1,353	2,325	2,506	1,890
Distribution Losses (l/prop/d)	57	191	113	-	-	-	-	-	-	-	-
Est. supply pipe leakage (l/prop/d)	14	54	41	-	-	-	-	-	-	-	-
Total Leakage (l/prop/d)	80	238	154	704	530	181	361	225	171	159	274
Proportion of water delivered to Non H/H	20%	47%	32%	38%	45%	45%	45%	40%	41%	10%	40%
H/H water Delivered/ Population (l/head/d)*	126	185	158	313	274	303	144	207	278	485	298

* includes supply pipe leakage

The main distinction here is the enormous variation between consumption patterns for most of the USA companies and that in England & Wales. Most have apparent per capita consumption at least twice the UK level. There is, however, a marked variation among the USA companies with both Pennsylvanian companies (PEN and PH) closer to the England & Wales level. This raises questions as to whether the consumption data is defined consistently to include both internal and external use. These differences have consequences for other areas such as the unit cost analysis below.

Clearly climate and social and economic trends are important determinants of the higher water use in the USA. Swimming pools and air conditioning are very widespread and use large amounts of water. Garden watering will also generate high consumption in arid areas such as California, particularly if inhabitants wish to maintain "temperate zone" gardens with lawns in the face of low rainfall.

All of the USA companies appear to have higher leakage levels per property than in England & Wales. This may be a consequence of the higher-pressure levels for which the distribution systems are operated at in order to support the high levels of consumption. The exception is Southern California where, despite the fact that consumption is by far the highest, leakage levels are closer to those in England & Wales.

UNIT COST COMPARISONS

Table 43 below sets out volumetric unit costs for each of the main components of customers' bills. It includes a breakdown by sub-service area.

Table 43 Costs per unit of water delivered (p/m^3)

	England & Wales			CAL	IND	NJ	PEN	PH	SJ	SC	SLC
	Lowest	Highest	Average								
Cost of operations	**25**	**52**	**32**	**27**	**17**	**31**	**33**	**26**	**23**	**23**	**17**
Resources and treatment	*6*	*18*	*10*	*16*	*6*	*16*	*10*	*11*	*16*	*13*	*7*
Distribution	*7*	*20*	*11*	*3*	*2*	*5*	*7*	*4*	*3*	*2*	*4*
Business activity	*7*	*14*	*10*	*8*	*9*	*10*	*16*	*11*	*4*	*8*	*6*
Cost of capital maintenance	**9**	**26**	**18**	**3**	**3**	**8**	**12**	**7**	**3**	**3**	**5**
Return on capital	**9**	**49**	**21**	**11**	**13**	**40**	**43**	**37**	**11**	**13**	**12**
TOTAL COST	**50**	**126**	**71**	**40**	**33**	**79**	**88**	**70**	**37**	**39**	**34**

Note. Data for the 'Lowest' and 'Highest' columns is not additive.

The results are largely as one would expect, with the high volumes leading to low unit costs compared to the England & Wales companies. In particular distribution costs are much lower, suggesting that economies of scale are evident in this sub-service. The same seems to apply to capital maintenance charges. The return on capital component varies considerably among the companies reviewed.

Because of the wide variations in consumption levels and the fact that volume may be a poor determinant of costs for some areas of operations, an alternative analysis is given in Table 44 below in terms of cost per property.

[INSERT GRAPHS]

Table 44 Costs per property of water delivered (£/property)

	England & Wales			CAL	IND	NJ	PEN	PH	SJ	SC	SLC
	Lowest	Highest	Average								
Cost of operations	**50**	**89**	**65**	**195**	**101**	**165**	**120**	**109**	**180**	**199**	**101**
Resources and treatment	12	41	21	117	35	86	37	46	125	113	39
Distribution	16	37	23	22	10	25	24	16	23	16	26
Business activity	15	31	21	56	57	53	59	47	32	70	36
Cost of capital maintenance	**18**	**53**	**37**	**23**	**18**	**45**	**43**	**30**	**26**	**25**	**28**
Return on capital	**18**	**68**	**43**	**77**	**81**	**211**	**155**	**153**	**89**	**111**	**70**
TOTAL COST	**99**	**179**	**145**	**295**	**200**	**420**	**318**	**292**	**295**	**335**	**199**

Note. Data for the 'Lowest' and 'Highest' columns is not additive.

Table 44 gives a very different picture with costs in the USA being far higher than in England & Wales. However these comparisons are also distorted as the higher occupancy rate in the USA means that each property will, to an extent generate higher costs.

FINANCIAL PERFORMANCE

Table 45 reviews some of the financial information provided in the NAWC report. USA companies' accounts are prepared on an historic cost basis. There is therefore no concept of the MEA replacement value as used in England & Wales.

Overall there is a good correspondence between USA and England & Wales indicators with most lying within the range of the England & Wales companies. Other than Indianapolis (IND), dividend levels are also similar. The return on assets and operating margin is somewhat higher than in England & Wales for a number of companies, particularly for New Jersey (NJ), Pennsylvania and Philadelphia. This gap may widen following the effects of the Periodic Review.

Table 45 Financial Ratios

	England & Wales			CAL	IND	NJ	PEN	PH	SJ	SC	SLC
	Lowest	Highest	Average								
Estimated Capital Employed											
Water Service (£/prop)	-	-	-	745	952	1,648	1,394	1,213	788	1,055	708
Sewerage Service (£/prop)	-	-	-	-	-	-	-	-	-	-	-
Water & Sewerage	847	1,935	1,153	-	-	-	-	-	-	-	-
Net replacement cost (MEA) (£/prop)	7,494	11,560	8,975	Not applicable in the USA							
Dividend + Interest / capital employed	5%	52%	11%	6%	2%	6%	7%	6%	4%	5%	5%
Historic cost interest cover	3.1	12.2	4.7	3.5	3.0	3.8	2.7	3.9	4.8	3.7	3.5
Return on Capital (Estimated Capital Employed)	7.1%	17.3%	9.6%	9.5%	7.2%	12.5%	10.3%	11.8%	10.6%	9.8%	8.5%
Return on Capital (MEA)	0.8%	2.6%	1.3%	Not applicable in the USA							
Operating margin (%)	19%	49%	36%	24%	34%	49%	45%	49%	28%	31%	30%

KEY CONCLUSIONS

- As with the Australian companies, consumption levels at nearly twice the England & Wales average make comparisons of costs more difficult. Because of the high consumption levels, volumetric unit costs appear very much lower for the USA companies than England & Wales. In contrast total costs per property are a good deal higher, in particular for resources and treatment.

- Financial indicators show a reasonable degree of comparability with England & Wales with most indicators lying within the range reported by the England & Wales companies.

4. ANNEXES

ANNEX A DATA COMPARABILITY

The data used in this report has been compiled from a variety of sources including trade association publications and the annual reports and accounts of the enterprises concerned. Differences in definitions used and assumptions made may therefore mean that information is not on a comparable basis to that carefully defined in the June Return and audited by Reporters.

The potential problems with the data are set down below. Depending on the use that is made of these comparators, these will require further investigation to assess the effect of differing definitions and assumptions in the countries concerned.

At a general level, financial information collected from overseas will vary depending on the exchange rate. In this report, average rates over the relevant period have been used. However even over 12 months, exchange rates may not reflect differences in the purchasing power of different currencies. Sterling was particularly strong over the 1998-99 period, particularly compared to European currencies. Therefore efficiency comparisons in particular need to be treated with caution.

Operating expenditure data

This may include work on capital equipment undertaken by companies' employees, which would be excluded in Ofwat's definitions. Adjustments have been made to the Netherlands data for this reason.

Costs associated with providing services other than the provision of water and sewerage supply to third parties may be included. These are separately identified in Ofwat's June Return tables. Costs associated with bulk supply arrangements may also be included. Although these would be included in Ofwat data, bulk supplies are more common in other countries. There may be an impact on unit cost calculations if costs associated with supplying properties outside the company's area are included.

Different levels of contracting out will increase operating costs at the expense of capital maintenance and the return on capital component. This is particularly the case for Build, Own and Operate (BOO) and/or Private Finance Initiative (PFI) arrangements for treatment works. This is equally a problem when comparing England & Wales companies.

Capital maintenance charges data

The accounting treatment will affect the level of the depreciation change. Current cost accounts will tend to increase the capital maintenance charge but arguably may be a more accurate way of recording the depreciation requirement as historic cost depreciation fails to take account of inflation.

Return on capital data

This is calculated as a residual so it is important that turnover is collected on a comparable basis. The main problem is where turnover figures include income from sources other than those collected for the supply of water and sewerage services. In the main the problem relates to the treatment of capital expenditure items and new connections. As discussed above, the Netherlands' accounts include some capital items produced by the companies' employees. These appear as a turnover item for which the company charges itself as well as an operating cost item. Adjustments have been made to remove this where possible.

In Australia, revenue for new connections appears as a turnover item whereas elsewhere these are treated as negative capital expenditure. Some adjustments have been made, but in others turnover and hence the return on capital item may be overstated.

Water delivered data

The water balance is important both in itself and when comparing costs. The methodology in England & Wales is that each component including leakage is estimated separately and then checked against top-down estimates. In other countries, with comprehensive metering, a different approach is taken with one component (usually leakage) estimated as a residual. This has the risk that inaccuracies in other areas (e.g. meter under-registration or supply pipe leakage) are accumulated in the leakage estimate.

The Netherlands data for leakage is suspiciously low and is not likely to be comparable to the data reported in England & Wales. Different leakage figures are often the result of circumstances such as the need to maintain a certain pressure level or the resource position in a country.

Properties served data

Differences in interpretation will again affect the unit cost comparisons. A key question is the treatment of blocks of flats and other multi-household buildings. In the June Return guidance such properties are treated as non-households. In other countries such properties may be regarded as a single connection – which would show very high per property usage - or as multiple households.

Financial indicators data

As well as the points made above on different accounting systems and potential distortions of operating costs and turnover, there are a few other difficulties when interpreting financial data. The extent to which companies have financed their assets rather than just operating them will affect the operating margin required to generate a return on that investment. A low capital value allows a lower operating margin to be sufficient.

The other main difficulty is exceptional and atypical earnings such as profits made on the disposal of land or other assets. These have been removed from the analysis wherever possible.

ANNEX B DETAILED DATA TABLES

The following tables contain more detailed data for all companies, including those in England & Wales. Data has been collated from a number of sources including annual reports, trade association publications and data submitted to Ofwat.

The tables contain:

- Base data including property and population numbers, volumes of water and sewage, mains and sewer length and turnover;

- Water delivered data including total input, leakage and consumption;

- Financial ratios including estimates of capital, dividend and interest cover and return on capital.