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April 2004

Investment and Asset Management Report 2002-03

Scottish Water

WATER INDUSTRY COMMISSIONER FOR SCOTLAND

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Foreword

This is the second *Investment and Asset Management Report* that my Office has produced. It examines the investment performance of Scottish Water since its creation in April 2002.

The report provides an objective assessment of investment in the water industry in Scotland. It also gives the most up to date information available on the overall condition and performance of the industry's assets. Perhaps most crucially, it alerts customers to the slow progress that Scottish Water is making in delivering the vital improvements to public health and the environment which are included in the *Quality and Standards II* investment programme.

In the Foreword to my first *Investment and Asset Management Report*, I said that I would highlight immediately any shortfalls in performance. Our review of progress in delivering the *Quality and Standards II* programme reveals that Scottish Water has so far delivered around £743 million of investment. This compares with the £847 million that was funded in the *Strategic Review of Charges*. More worryingly, no more than £600 million of the money spent so far appears to relate to agreed *Quality and Standards II* projects.

This means that Scottish Water still has to deliver over £1,200 million of outputs defined by *Quality and Standards II*. To accelerate investment on such a scale, and still deliver it efficiently, will be a significant challenge. Only two companies south of the border have ever increased investment at a similar rate and no company has successfully increased actual capital spending by the cash amount required. What is more, the latest information from Scottish Water suggests that £967 million of the *Quality and Standards II* capital programme (more than half of the programme) has not yet progressed beyond project feasibility.

Scottish Water asserts that the programme will be delivered on time and to budget. Given progress to date, I have reservations about whether this assertion is realistic.

Customers must now start to see the benefits of the *Quality and Standards II* programme and the modern sustainable water industry that should result. This is not simply a question of spending the £1.8 billion that was allocated to capital expenditure; it also means delivering all of the benefits to customers, public health and the environment that were defined in the programme. We should not cut costs by cutting corners.

It is therefore vital that the Scottish industry makes progress towards the capital efficiency targets set out in the *Strategic Review of Charges 2002-06*. Failure to achieve these targets could result in one or more of the following undesirable outcomes:

- deteriorating asset condition and performance,
- higher prices,
- lower levels of customer service,
- lower levels of compliance with environmental or public health targets than has been agreed, and/or
- a greater burden on public expenditure.

It is better for customers that we accept a modest delay in the delivery of investment than we compromise on progress towards benchmark efficiency. To do otherwise would significantly increase the costs to customers of future investment programmes and reduce the outputs that would be affordable.

On a more encouraging note, Scottish Water has this year presented new information on the condition and performance of its assets. This information has been verified by leading water engineering consultants. It confirms my conclusions, presented in last year's *Investment and Asset Management Report*, that the condition of Scottish Water's assets is on a par with those in England and Wales.

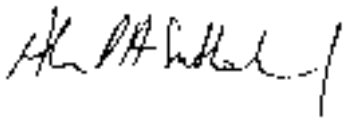
I can also confirm that investment commitments included in *Quality and Standards II* are sufficient to ensure that investment per household is broadly similar both sides of the border. We have reliable information that confirms this to be true for the period 1996-2006. It also appears to be true for the period 1985-2006, although information for the early part of this period is less robust.

Unfortunately, the effectiveness of capital expenditure in delivering improvements to Scottish customers has been significantly reduced by the relative inefficiency of capital investment in Scotland relative to south of the border. This has cost £896 million since 1996 or £386 for the average household.

Improved efficiency is vital because significant additional investment will continue to be necessary for the forseeable future. The companies in England and Wales expect to spend around £20 billion over the period 2005-10. This equates to £182 per household per year. The investment required in Scotland is likely to be greater, even if all of the efficiency targets set in my *Strategic Review of Charges* are met.

My role is to make sure that those who are paying for improvements – that is, Scottish Water's customers – get value for money. I believe that customers should be given information about where their money is being spent and what benefits result. I will of course give credit when Scottish Water delivers the outputs of the agreed investment programme in an efficient way.

I expect Scottish Water to make better progress in delivering *Quality and Standards II* efficiently over the coming year. This would be excellent news for all of us. There is a very long way to go but Scottish Water will have to make a realistic assessment of what can be achieved by the end of the current regulatory period. Improved efficiency in the planning and delivery of capital expenditure ought to be the priority.



Alan D A Sutherland
Water Industry Commissioner for Scotland
April 2004

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Executive summary

This is the second *Investment and Asset Management Report*. It examines the investment performance of Scottish Water since its creation in April 2002. It covers the first year of the four-year £1.8 billion *Quality and Standards II* investment programme.

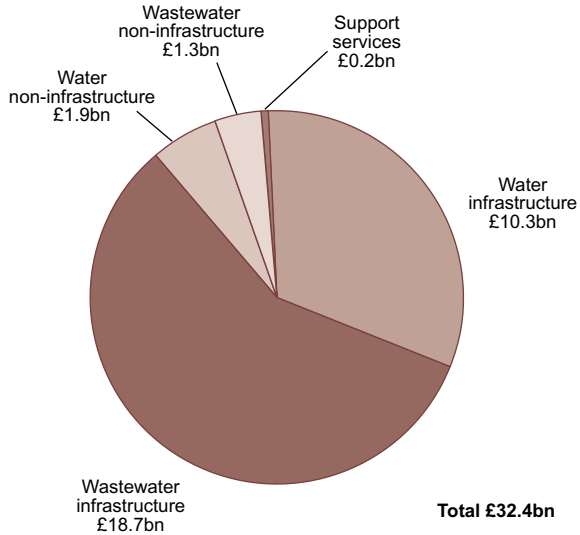
Water and wastewater assets

The assets required to deliver water and wastewater services can be divided into five broad types:

- **water infrastructure** (the underground network of pipes);
- **water non-infrastructure** (water treatment works);
- **wastewater infrastructure** (mainly comprises sewers);
- **wastewater non-infrastructure** (wastewater treatment works); and
- **support services** (the operational assets that are essential to the effective management of the business).

These five asset types have quite different useful lives and, to be effective, investment should be planned accordingly. Managing a £32 billion asset base is complex, but the high number of individual assets means that it is possible to renew assets on a rolling basis. The challenges faced by Scottish Water in managing its assets are similar to those faced by the water and wastewater providers in England and Wales.

Figure 1: Costs to replace Scotland's water and wastewater assets



Why investment is important to customers

Investment in water and wastewater assets is necessary to:

- maintain the level of service to customers – the assets of any business need to be replaced at the end of their useful lives if business is to continue;
- improve the quality of service to customers and the public – investment in assets is necessary to meet higher environmental and quality standards;
- respond to customers' changing demand patterns – the assets' capacity may need to be increased in order to meet both the demands of new customers and growth in usage from existing customers.

Historic investment levels in Scotland

When making comparisons between levels of investment in Scotland with those in England and Wales, it is necessary to take account of various factors that may influence the levels of investment seen on either side of the border. These factors include geography and population density, as well as relative efficiency levels, the timing of investment and the significant use of Private Finance Initiative (PFI) schemes in Scotland.

Investment in England and Wales has recently stabilised at around £3 billion per year. The Strategic Review of Charges, which covers the period 2002-06, foresees investment in Scotland stabilising at an average level of around £450 million per year.

Table 1: Total investment

Year	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03
Scotland excluding PFI	£252m	£277m	£346m	£397m	£428m	£460m	£353m
Capital element of PFI	£3m	£15m	£15m	£136m	£170m	£126m	£65m
Scotland total	£255m	£292m	£361m	£533m	£598m	£586m	£418m
England and Wales total	£3,160m	£3,664m	£3,670m	£3,642m	£2,744m	£2,983m	£3,450m

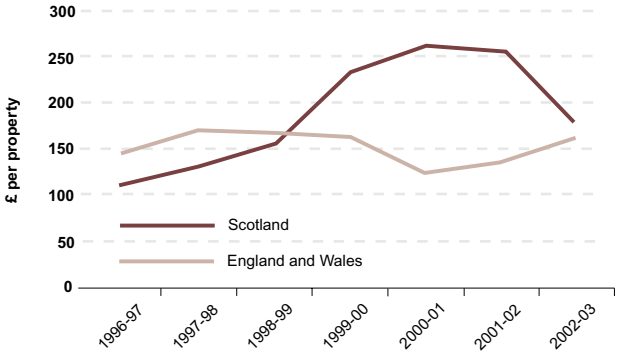
These absolute levels of investment do not present a complete picture. A more accurate measure is the level of investment per property, adjusted for relative efficiency. This is shown in Table 2.

Table 2: Efficient effective investment per household

Year	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03
Scotland	£84	£92	£109	£170	£188	£177	£125
England and Wales	£144	£167	£167	£166	£125	£136	£157

The investment planned in *Quality and Standards II* means that per household investment in Scotland is set to increase significantly. On this basis, investment expenditure on a per property basis over the entire 10-year period from 1996 to 2006 will be marginally higher than that in England and Wales.

Figure 2: Actual and projected investment per property in Scotland and in England and Wales



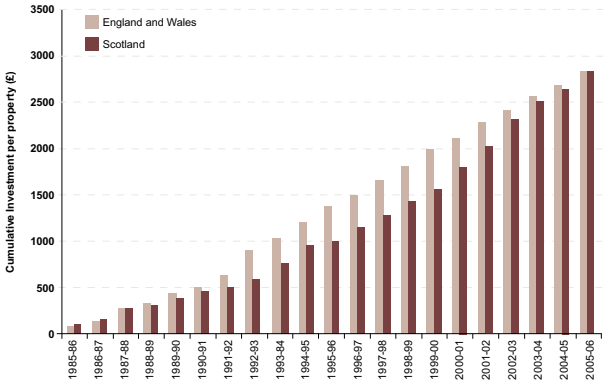
It is, however, important to note that the relative inefficiency of capital expenditure planning and delivery in Scotland has cost customers some £896 million since 1996. This is equivalent to £386 for each property served by the industry in Scotland.

Unless the efficiency of capital expenditure is improved significantly, it is possible that future desirable outputs may be delayed because they are considered unaffordable.

Longer term investment trends

While information on levels of investment before the creation of the three authorities is less robust, it is possible to compare the levels of investment reported in the capital accounts of the Regional and Island Councils. This would suggest that cumulative investment per property since 1985 is broadly similar in Scotland and in England and Wales.

Figure 3: Cumulative investment per property in Scotland and England and Wales[1]



There would not appear to be any evidence to support the contention that there is a significant backlog of investment in Scotland relative to that in England and Wales due to a lack of capital expenditure. Nor should lack of funds for investment in recent years be a valid justification for poorer customer service or operational efficiency. Customers in Scotland have paid for, and so deserve, an equivalent standard of service.

Condition of Scotland's asset base

Asset condition is assessed on a scale of 1-5, with 1 representing 'very good' and 5 representing 'very poor'. We have taken information about the condition of Scottish Water's assets from the regulatory information that it has provided to us over the past two years.

We have focused on the percentage of each asset class in condition grades 4 and 5 for the four main components of a water and wastewater company's asset base, namely water treatment works, water

[1] We have adjusted the levels of investment for inflation and for the impact of PFI investment. Efficiency adjustment is not included.

mains, wastewater treatment works, and sewers. These comprise approximately 80% of the replacement cost of the total asset base.

Figures 4 to 7 show the respective position of the Scottish asset base, for this year and last year, in each of the four main asset categories.

Figure 4: Water treatment works in condition grades 4 and 5

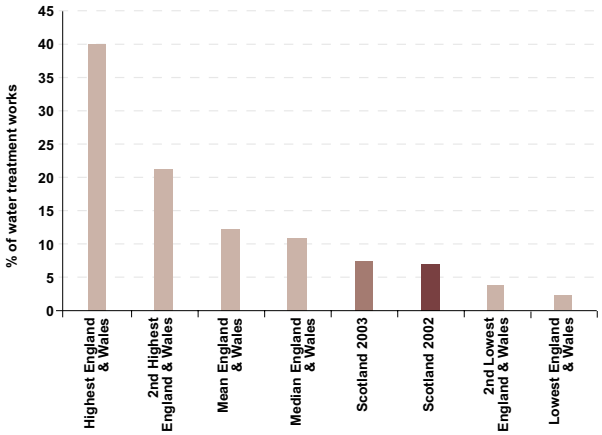


Figure 5: Water mains in condition grades 4 and 5

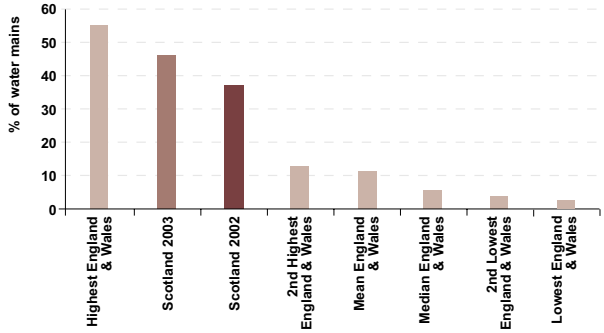


Figure 6: Wastewater treatment works in condition grades 4 and 5

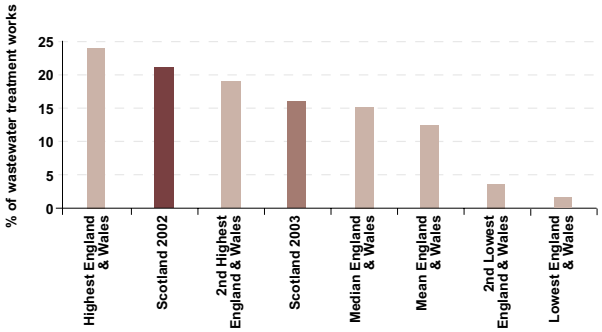
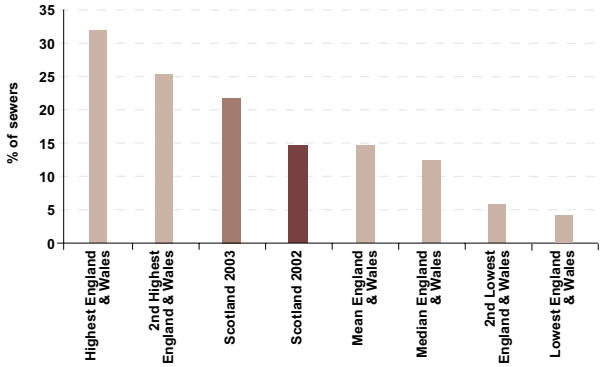


Figure 7: Sewers in condition grades 4 and 5



These results indicate that, with the possible exception of water mains, the condition of assets in Scotland remains very similar to those in England and Wales. For all asset categories, the percentage of 'poor' and 'very poor' assets in Scotland lies within the range of condition grades reported by companies in England and Wales.

WRc, an independent consultancy, has recently assessed the information contained in Scottish Water's asset inventory. We have been advised by Scottish Water that WRc's assessment concluded that the condition and performance grades reported by Scottish Water were, in the main, accurate.

Our analysis suggests that, as last year, the condition of the asset base in Scotland lies within the range of condition grades observed in England and Wales. The condition of Scottish Water's assets would not appear to justify either poorer customer service or a lack of progress towards benchmark efficiency.

Quality and Standards II

Quality and Standards II defines the planned investment in the water industry in Scotland for the period from April 2002 to March 2006. In the *Strategic Review of Charges* we examined the scope for capital efficiency in this programme and required Scottish Water to deliver the investment outputs for £1.8 billion. Customers will wish to be assured that this significant investment is on track.

Customers will also rightly expect that this investment will be delivered efficiently. It is critical to the affordability of future investment programmes that the capital efficiency targets set in the *Strategic Review of Charges 2002-06* are met.

Failure to meet targets could adversely impact on both the current and future improvements to the environment, public health and service levels that we all want to see.

Expenditure to date on *Quality and Standards II*

One way to assess Scottish Water's performance in delivering investment is to analyse the amount of money spent (and forecast to be spent) against the investment profile set out in the *Strategic Review of Charges*.

Table 3: Scottish Water's capital expenditure 2002-06

	2002-03	2003-04	2004-05	2005-06
Year 1 actual and year 2 forecast	£353m	£390m		
Cumulative total	**£353m**	**£743m**		
Strategic Review Profile	£436m	£411m	£501m	£463m
Cumulative total	**£436m**	**£847m**	**£1,348m**	**£1,810m**

In 2002-03, Scottish Water invested £353 million[2]. This is a significant reduction from the £460 million[3] invested in 2001-02, the final year of operation of the three former authorities.

We forecast total expenditure to be no more than £743 million over the first two years of the current review period. This is a shortfall of at least £104 million in capital investment compared with the profile of investment set out in the *Strategic Review of Charges*.

Scottish Water's quarterly Capital Investment Return provides a breakdown of expenditure at a project level. It also allows us to determine whether or not this expenditure relates to projects in the *Quality and Standards II* list as defined by WIC18[4]. This allows us to monitor progress in delivering the projects defined in the *Quality and Standards II* programme.

In its Capital Investment Return, Scottish Water indicated that around £500 million of investment over the last two years relates to defined *Quality and Standards II* projects. We have analysed spending on these and other projects and compared the capital investment return in detail to the WIC18 defined list.

Table 4: Assessed extent of *Quality and Standards II* expenditure

	2002-03	2003-04	2004-05	2005-06
Year 1 actual and year 2 forecast	£295m	£305m		
Cumulative total	**£295m**	**£600m**		
Strategic Review Profile	£436m	£411m	£501m	£463m
Cumulative total	**£436m**	**£847m**	**£1,348m**	**£1,810m**

Our current best estimate is that total investment in the *Quality and Standards II* programme during the first two years of the period will be no more than £600 million. This estimate suggests that around one fifth of Scottish Water's forecast £743 million of capital investment over the two-year period from April 2002 to March 2004 relates to projects that do not form part of the *Quality and Standards II* investment programme.

Scottish Water has indicated that a significant element of capital expenditure over the last two years has been associated with 'carry over' of *Quality and Standards I* projects. There is clearly an inconsistency between this assertion and the analysis of investment spending that we completed for last year's *Investment and Asset Management Report*[5]. This showed that the £888 million invested in the *Quality and Standards I* period was consistent with forecast expenditure of £890 million.

We asked for, and received, information from Scottish Water to support the £157 million of *Quality and Standards I* inherited liabilities that are being claimed. Our analysis of the information provided has found only limited evidence of expenditure on projects that were not in the *Quality and Standards II* programme.

[2] Excludes any PFI element, estimated at £65 million in 2002-03 (see Chapter 3, Table 3.1).
[3] Excludes any PFI element, estimated at £126 million in 2001-02 (see Chapter 3, Table 3.1).
[4] WIC18 is the defined list of projects that comprise *Quality and Standards II*. A copy of this letter is reproduced in the *Strategic Review of Charges 2002-06*, page 589.
[5] *Investment and Asset Management Report 2000-02*, Water Industry Commissioner for Scotland, March 2003.

Progress in delivering *Quality and Standards II* projects

Our analysis of regulatory returns also allows us to determine how much progress Scottish Water has made in delivering the investment programme. Progress on each project is reported by reference to a series of standard milestones.

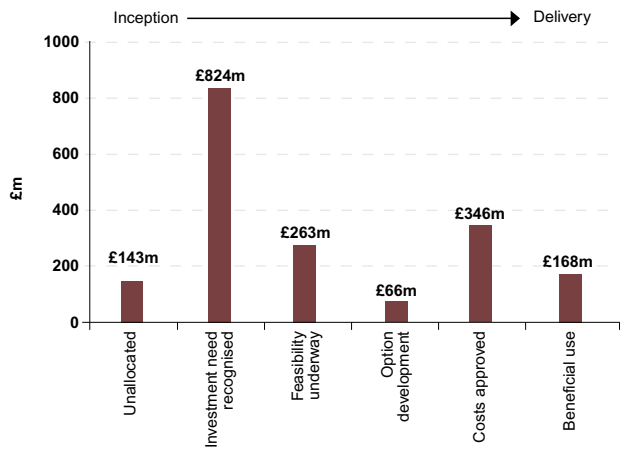
The proportion of projects at each of the key milestones is shown in Table 5.

Table 5: *Quality and Standards II* project progress

Current project status	Number of projects	2002-06 total spend (forecast)	Percentage of total programme spend	Cumulative percentage of total programme spend
Unallocated	-	£143m	7.9%	7.9%
Investment need recognised	2,517	£824m	45.5%	53.4%
Feasibility study underway	729	£263m	14.5%	67.9%
Option development underway	69	£66m	3.7%	71.6%
Costs approved and tender being awarded	190	£346m	19.1%	90.7%
Project completed to permit beneficial use	322	£168m	9.3%	100%
All projects	**3,827**	**£1,810m**	**100%**	

It is of some concern that less than 10% of the projects that comprise the *Quality and Standards II* programme have been completed to beneficial use. What is more, over half of the programme has not reached the initial feasibility study milestone. This suggests that delivering the programme will represent a significant challenge.

Figure 8: Project value at each key milestone



Delivery of *Quality and Standards II* outputs

It is also possible to chart Scottish Water's progress in delivering the *Quality and Standards II* outputs. Examples of progress in delivering two of the key outputs are shown in Table 6.

Table 6: Progress in replacing water mains and sewers during 2002-03

	Quality and Standards II target	Completed to date	Percentage of target completed by April 2003
Length of water main to be relined/replaced	3,051km	454km	15%
Length of sewer to be rehabilitated	446km	60km	13%

Replacing worn out water mains and sewers is a vital element of *Quality and Standards II* and brings a range of benefits for customers. Unfortunately, delivery during the first year was slow.

Delivery of the remainder of the *Quality and Standards II* programme

If Scottish Water phases its capital expenditure in a way that differs from the profile set out in the *Strategic Review of Charges*, this does not necessarily jeopardise the efficient delivery of this investment. However, Scottish Water faces a significant challenge in attempting to deliver efficiently the level of investment that is now required for the last two years of the period. Its ability to deliver the investment will also be constrained by other factors, such as the time it takes to consult with customers, achieve planning permission and hire contractors.

Scottish Water is forecast to have delivered £743 million of expenditure, of which up to £600 million is *Quality and Standards II* investment, by the end of the financial year 2003-04. This leaves over £1,200 million of *Quality and Standards II* investment to deliver in the remaining two years of the period. This is a 63% increase on the level of expenditure that was delivered in the first two years[6].

[6] This figure assumes that the required increase is based on the total expenditure during the first two years. A more pessimistic assumption would be that the increase should be based on the extent of *Quality and Standards II* delivery during the first two years. This would give a required increase of 102%.

Table 7: Forecast remaining *Quality and Standards II* investment

	Total expenditure 2002-03 – 2003-04	*Quality and Standards II* expenditure 2002-03 – 2003-04	Remaining expenditure 2004-05 – 2005-06	Percentage increase required
Scottish Water actual and forecast	£743m	£600m	£1,210m	63%
Strategic Review profile	£847m	£847m	£963m	14%

The delay to date in delivering the *Quality and Standards II* investment programme means that a significant 'ramp up' in expenditure is required over the remainder of the period. The longer delivery is delayed, the harder it will become for the required outputs of the investment programme to be delivered. This will impact on customers in two ways by:

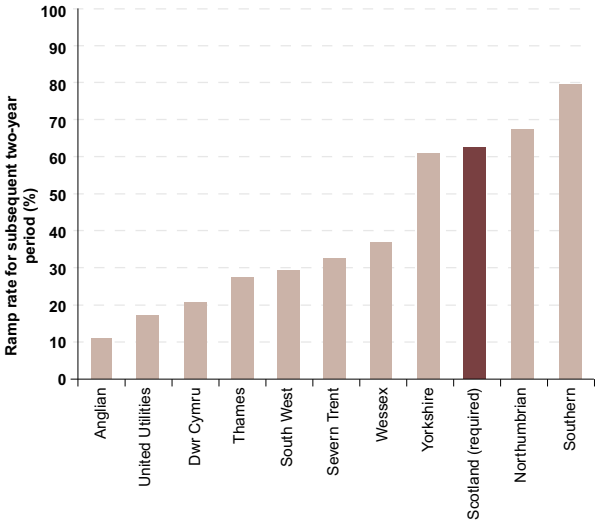
- significantly increasing the risk that *Quality and Standards II* outcomes are not delivered;
- reducing the likelihood that efficiencies required in both capital investment and operating expenditure are achieved.

It is particularly important to appreciate that the 'ramping up' of investment has to be completed at the same time as a step change in Scottish Water's capital efficiency is achieved.

Improving the efficiency of delivery is not just important to the delivery of the current programme to budget; it is also essential to reducing the costs to customers of the future improvements that we would all like to see. It would be better for customers to accept a small delay in delivery now rather than to compromise on the efficiency of delivery of the current and future programmes.

In order to gain an insight into the extent of the challenge that Scottish Water faces, we examined levels of investment achieved by the companies south of the border. We analysed the ten-year period from 1992-93 to 2001-02 when investment in England and Wales increased rapidly following privatisation. For each company, we established the maximum ramp rate achieved over any subsequent two-year period.

Figure 9: Maximum historical investment ramp rates



We also examined the increase in investment level required and compared this with the levels that have previously been achieved by the privatised companies in England and Wales.

Table 8: Maximum two-year increase in investment, by company

Company	Maximum historical investment ramp rate for subsequent two-year period	Initial two-year investment total	Following two-year investment total	Increase in investment for two-year period
South West	29%	£251	£324	£73
Wessex	37%	£213	£292	£79
Anglian	11%	£724	£806	£82
Dwr Cymru	21%	£486	£590	£104
United Utilities	17%	£947	£1,112	£165
Northumbrian	67%	£337	£562	£225
Thames	27%	£831	£1,058	£227
Yorkshire	61%	£486	£784	£298
Southern	79%	£375	£673	£298
Severn Trent	33%	£951	£1,264	£313
Scotland (required)	**63%**	**£743**	**£1,210**	**£467**

The increase in investment that is required in Scotland, at £467 million, is almost 50% greater than the highest level achieved by the England and Wales comparators (£313 million).

Conclusions

Efficient and effective delivery of the *Quality and Standards II* programme is essential if customers are to benefit from the better water quality, environmental improvements and higher service standards for which they have paid.

Our analysis of investment levels, the condition and performance of the industry's assets and the delivery of *Quality and Standards II* has highlighted a number of key issues for customers.

- The condition and performance of the assets in Scotland are no worse than those in England and Wales and cannot be used to justify poor customer service.

- The effectiveness of Scottish Water's extensive investment programme is being reduced because of inefficiencies in the delivery of capital projects. Since 1996 this inefficiency has cost £896 million or £386 for every property in Scotland.

- Delivery of the *Quality and Standards II* investment programme is off to a slow start. This delay will impact on much needed improvements to water quality, environmental standards and customer service.

- From the information provided to us, we estimate that up to £600 million, around four-fifths, of the forecast £743 million of capital expenditure over the two-year period from April 2002 to March 2004, will relate to *Quality and Standards II* projects.

- Nearly half way through the investment period, less than 10% of the projects that comprise the *Quality and Standards II* programme have been completed to the point where customers are receiving the benefits of the investment. More than half have not yet passed the early design stages.

- The longer projects are delayed, the harder it will become to deliver the programme efficiently. The rate of increase in delivery required over the last two years of the *Quality and Standards II* period is approaching the highest ever achieved in the water industry since 1992. The required increase in actual capital expenditure committed is with out precedent.

- The long–term customer, environmental and public health interest would be better served by making efficiency improvements the priority – even if that results in some small delay to the delivery of the *Quality and Standards II* programme.

- One of the key roles of regulation is to make sure that customers are given information both about where their money is being spent, and whether or not the improvements they have paid for are being delivered. We will continue to monitor and report on Scottish Water's performance in delivering value for money through its investment programme.

Chapter 1

Introduction

Each year we report on progress in the Scottish water industry in three reports. These are:

- a costs and performance report,
- a report on the investment and asset management of the industry, and
- a report on the level of service provided to customers.

The *Investment and Asset Management Report* provides information about investment levels in the water industry in Scotland in recent years and compares this investment with England and Wales. It also seeks to benchmark the condition and performance of assets in Scotland against those south of the border. Information is also provided on Scottish Water's performance in delivering the *Quality and Standards II* investment programme.

This report covers primarily the financial year 2002-03. It therefore relates to Scottish Water's first year of operation and the first year of the four-year £1.8 billion *Quality and Standards II* investment programme. Efficient delivery of this programme is essential in ensuring that much needed improvements in water quality, environmental standards and customer service are delivered. This report examines whether Scottish Water is delivering investment in a way that is likely to ensure value for money for customers.

The report contains six chapters. Chapter 2 describes the asset base in Scotland and the drivers of investment. Chapter 3 compares historic levels of investment in Scotland with those in England and Wales. Chapter 4 outlines the condition and performance of the assets in Scotland and compares them with assets south of the border. Chapter 5 discusses how Scottish Water is performing in delivering the *Quality and Standards II* programme. A short concluding chapter then follows.

Chapter 2

Water and wastewater assets

In this chapter we describe the range of assets that are necessary to deliver a water and wastewater service, with particular reference to the size and composition of the asset base. We then examine what drives investment requirements in the industry and discuss the importance of this investment in maintaining and improving the quality of service to customers.

2.1 Water and wastewater assets

The assets required to deliver a water and wastewater service can be divided into five broad types:

- **Water infrastructure** – the underground network of pipes, pumps and valves through which potable water is supplied to customers. Water infrastructure also includes dams, reservoirs and raw water aqueducts.
- **Water non-infrastructure** – includes water treatment works, pumping stations, service reservoirs and water towers.
- **Wastewater infrastructure** – mainly comprises sewers that collect sewage and storm water and transport it to where it can be treated. This category also includes sea outfalls.
- **Wastewater non-infrastructure** – includes wastewater treatment works, sewage pumping stations and sludge treatment facilities.
- **Support services** – the operational assets that are essential to the effective management of the business, including vehicles, information systems, offices, depots and stores.

The five asset types have quite different useful lives. Infrastructure assets typically have very long lives. For example, many of our sewers and water mains were built in Victorian times and can still be relied upon to provide good service. Water mains can generally be expected to last between 60 and 100 years. Sewers, if well maintained, should last between around 80 and 120 years. However, some sewers and water mains that were installed more recently (within the last 50 years or so) need to be upgraded or replaced with some urgency, in spite of their much younger age. This may be necessary because, for example, new technologies prove to be unreliable or as a result of flaws in design.

Most non-infrastructure assets also have relatively long lives. For example, service reservoirs and water treatment works can be expected to last in the region of between 30 and 50 years. Wastewater treatment works also have similar useful lives. By contrast, other water and wastewater above-ground assets, including pumping stations and valves, will typically have much shorter lives – often less than 15 years.

Some support service assets (such as vehicles and information technology) have short lives of between three and seven years, whereas offices, depots and stores would be expected to last longer.

Scottish Water's current assets

Information provided to us by Scottish Water lists its operational assets as including:

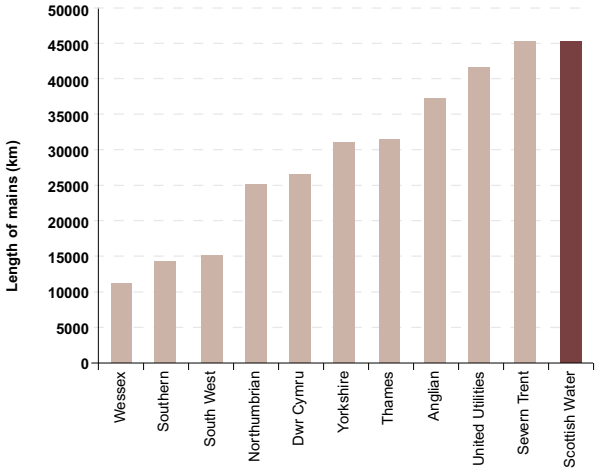
- 371 water treatment works,
- 1,896 wastewater treatment works (including septic tanks),
- 45,811km of water mains, and
- 39,334km of sewers.

It is useful to compare the physical size of Scottish Water's asset base with that of the ten water and wastewater companies in England and Wales. This provides an indication of the relative scale and complexity of the assets.

The four main components of a water and wastewater company's asset base are water treatment works, wastewater treatment works, water mains and sewers. Together, these comprise over 80% of the replacement cost of the total asset base. We therefore focus our comparisons on these four elements.

Comparing the asset base – water mains

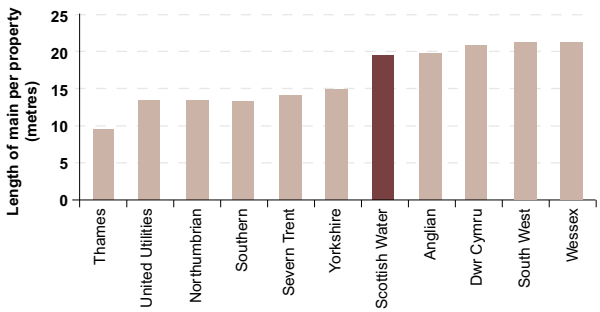
Figure 2.1: Length of water main by company



Scottish Water is responsible for a larger geographic area than any of the water and wastewater companies in England and Wales. However, the total length of water main is not materially greater than that observed in some companies in England and Wales. This no doubt reflects the fact that a high proportion of the Scottish population lives in the central belt and in coastal communities.

As we reported in our *Costs and Performance Report 2002-03*, the ratio of length of water main to the number of properties served is similar for all of the UK water and wastewater companies.

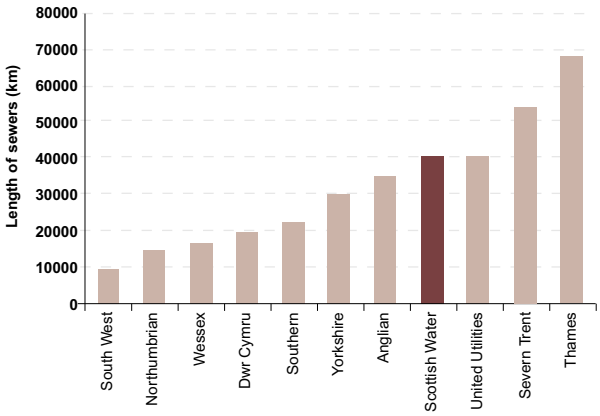
Figure 2.2: Ratio of the length of water main to the number of properties served



Comparing the asset base – sewers

A similar picture also emerges when comparing the length of sewer networks either side of the border. Scottish Water ranks fourth of the UK water and wastewater companies for the total length of sewers[7].

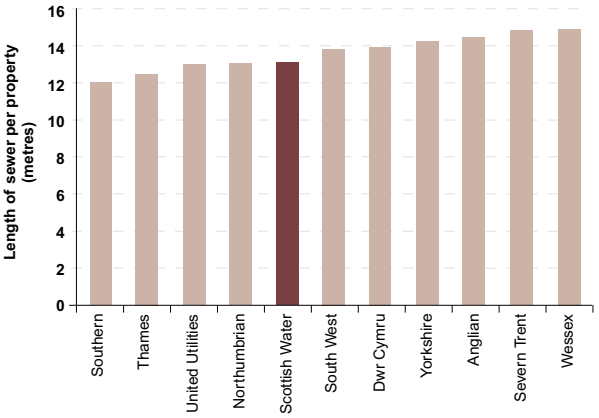
Figure 2.3: Length of sewer network by company



In our *Costs and Performance Report*[8] we also reported that the ratio of length of sewer to the number of properties served is similar for all of the UK water and wastewater companies[9].

Once again, it is clear that the larger geographic area does not mean that there is a larger sewer network.

Figure 2.4: Ratio of the length of sewer to the number of properties served



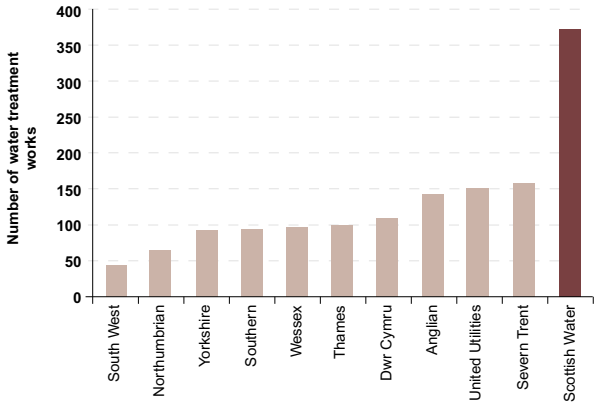
[7] This is despite the fact that differences in legislation in Scotland mean that, unlike in England and Wales, Scottish Water has responsibility for the parts of the sewer network, termed 'laterals', which run between the main sewer and the edge of customers' properties. These laterals account for around 10,000km of the total sewer length in Scotland.

[8] *Costs and Performance Report 2002-03*, Water Industry Commissioner for Scotland, November 2003 (Chapter 6, Section 6.1.2, page 24).

[9] This ratio excludes lateral sewers in Scotland as these are not part of the sewer network in England and Wales.

Comparing the asset base – water treatment works

Figure 2.5: Number of water treatment works by company

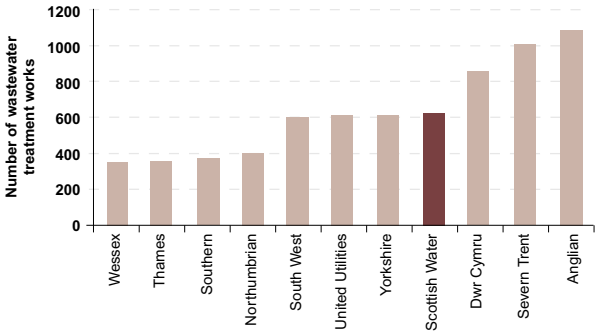


There are significantly more water treatment works in Scotland than in England and Wales. This can in part be attributed to the large number of small rural communities, particularly around the coastline in the north. However, of the 371 works in Scotland, 240 fall into the smallest reported category, with a capacity of less than 1 megalitre per day. This may indicate that in Scotland a less proactive approach has been taken to rationalising works. This has a potential impact on customers by increasing costs and making water quality management more complex.

Comparing the asset base – wastewater treatment works

Of the 1,896 wastewater treatment works in Scotland, 1,274 are very small public septic tank installations. These are relatively uncommon in England and Wales. Excluding these septic tanks, the number of wastewater treatment works in Scotland is similar to the number for companies in England and Wales.

Figure 2.6: Number of wastewater treatment works by company[10]



In summary, the asset base that Scottish Water operates is broadly similar in size and composition to that of the water and wastewater providers in England and Wales. The challenges that Scottish Water faces in managing this large portfolio of assets are significant, but are not materially different to those faced by companies south of the border.

In the following section we examine how the investment requirements to maintain and improve these assets are established.

2.2 Maintaining sustainable levels of service to customers

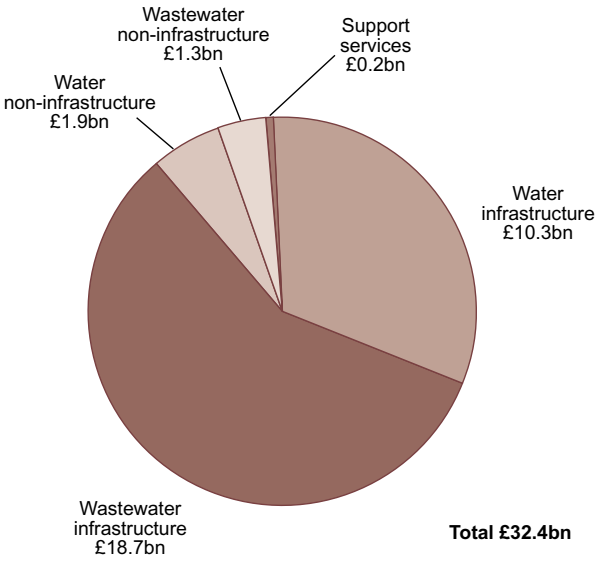
To replace all of the water and wastewater assets (pipes, valves, treatment works and so on) would cost something in the region of £32 billion[11] at today's prices. This gives a good idea of the extent of investment that has had to take place to achieve the water and sewerage service we now have.

Of course, this investment has taken place over a very long period. As the useful life of each asset varies, so investment to maintain and renew those assets can take place on a rolling basis. This means that investment can be prioritised on a yearly basis in a way that allows service to be delivered to customers as effectively and efficiently as possible.

[10] Excludes septic tanks.

[11] Since last year's *Investment and Asset Management Report*, Scottish Water has revised its assessment of the total value of its assets from £24.9 billion to £32.4 billion. It reported that this change is mainly due to a revised assessment of sewer depth and the inclusion of 'lateral' sewers (these connect main sewers to customers' properties), which had not previously been accounted for.

Figure 2.7: Costs to replace Scotland's water and wastewater assets



Why investment is important

Investment in water and wastewater assets is necessary to:

- **maintain the level of service to customers** – the assets of any business need to be replaced at the end of their useful lives if business is to continue;
- **improve the quality of service to customers and the public** – investment in assets is necessary to meet higher environmental and quality standards;
- **respond to customers' changing demand patterns** – the assets' capacity may need to be increased in order to meet both the demands of new customers and growth in usage from existing customers.

The very long useful life of assets in the water and wastewater industry lends itself to effective forward planning. This is true also of the relatively long lead times usually allowed for the introduction of tighter environmental and public health standards. This allows investment plans to be adapted in a way that is efficient both financially and operationally.

Funding this investment

The funding requirements for maintaining existing assets are generally treated differently from the funding of new or improved assets.

For existing assets, any prudently managed business will recognise the value that it receives from the asset base and will make appropriate levels of funding available to maintain this value. This value is typically recognised in financial accounting by making a depreciation charge to the profit and loss account, thereby reducing the profit earned. The water and wastewater business is no different. The water industry typically recognises two separate depreciation charges, one for above-ground assets and a second for the underground infrastructure.

To fund new investment within the timescales required by new obligations, Scottish Water may have to borrow capital, on behalf of all customers. Borrowing in this way allows the cost of new investment to be spread over time.

Borrowing can and should play an important role in smoothing the cash needs of Scottish Water over periods of particularly high investment. However, such borrowing should only be used when legislative, practical, or operational deadlines require accelerated capital spending. It must be borne in mind that borrowings need to be repaid with interest from future revenues. Moreover it is important to ensure that debt repayment associated with new borrowing can be afforded.

Additional borrowing will inevitably mean that Scottish Water has to raise more money from its customers in order to bring its revenue and asset replacement liabilities (ie the interest on the capital borrowings) back into balance.

A prudent and well-managed company will therefore increase borrowing only to fund asset improvements over periods of particularly high investment, not to maintain or replace those assets that have already been created and depreciated. This will ensure that customers' bills do not have to go up to finance increased borrowing without a corresponding benefit.

Chapter 3

Historic investment in Scotland

In this chapter, we examine historic levels of investment in Scotland and compare them with investment in the water and wastewater industry in England and Wales.

3.1 Investment levels

Making direct comparisons between the levels of investment in England and Wales and in Scotland is not a straightforward process. In addition to the obvious differences of geography and population density, adjustments also need to be made to reflect differences in the timing of investment and to reflect the significant use of Private Finance Initiative (PFI) schemes in Scotland in recent years.

The level of investment in England and Wales increased significantly after privatisation in 1989. By 1996-97, the privatised companies were investing some £3.5 billion per year. A significant proportion of this investment was driven by the Urban Waste Water Treatment and the Bathing Waters Directives.

Investment in Scotland began to increase significantly after the formation of the three former water authorities in 1996. Considerable use was made of PFI schemes to deliver the investment required to comply with the Urban Waste Water Treatment and the Bathing Waters Directives. The use of PFI means that the effective investment spend in Scotland is higher than it appears when examining the figures for direct capital investment.

Investment in England and Wales has recently stabilised at around £3 billion per year. *The Strategic Review of Charges*, which covers the period 2002-06, foresees investment in Scotland stabilising at an average level of around £450 million per year. The slow start in delivering the *Quality and Standards II* investment programme has resulted in a downturn in investment in Scotland during 2002-03, the first year of the programme. However, Scottish Water has given assurances that *Quality and Standards II* will be delivered in full by April 2006. This issue is discussed in more detail in Chapter 5.

[12] Robust and comparable information prior to 1996 is not available.

Table 3.1: Total investment[12]

Year	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03
Scotland excluding PFI	£252m	£277m	£346m	£397m	£428m	£460m	£353m
Capital element of PFI	£3m	£15m	£15m	£136m	£170m	£126m	£65m
Scotland total	£255m	£292m	£361m	£533m	£598m	£586m	£418m
England and Wales total	£3,160m	£3,664m	£3,670m	£3,642m	£2,744m	£2,983m	£3,450m

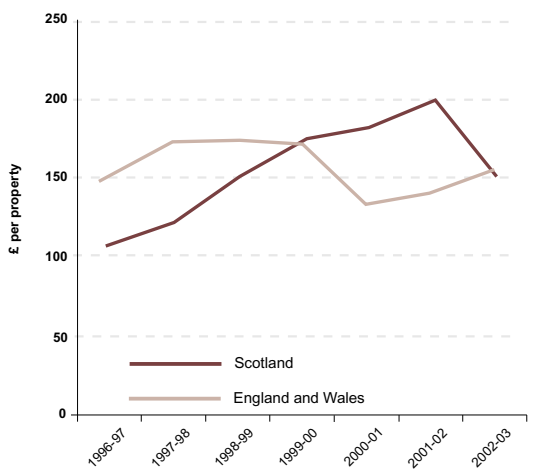
Absolute levels of investment do not, by themselves, present a complete picture. An alternative, more indicative, measure is the level of investment per property.

Table 3.2 indicates that in the period 1999 to 2002, even excluding investment delivered through PFI, the level of investment in Scotland rose significantly above that in England and Wales. This is in spite of the significant difference that existed when the three former water authorities were established in 1996. Although, in the first year of Scottish Water, investment per property has fallen below that of England and Wales, it is still significantly higher than during the early years of the three authorities.

Table 3.2: Levels of capital investment per property (excluding PFI)

Year	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03
Scotland	£109	£119	£149	£171	£184	£198	£152
England and Wales	£144	£167	£167	£166	£125	£136	£157
Difference	(£35)	(£48)	(£18)	£5	£59	£62	(£5)

Figure 3.1 Levels of capital investment per property (excluding PFI)



To illustrate this another way, the cumulative level of direct investment per property over the same period is shown in Table 3.3. Over the seven-year period, £22 more per property has been invested in Scotland than in England and Wales.

Table 3.3: Cumulative levels of capital investment per property (excluding PFI)

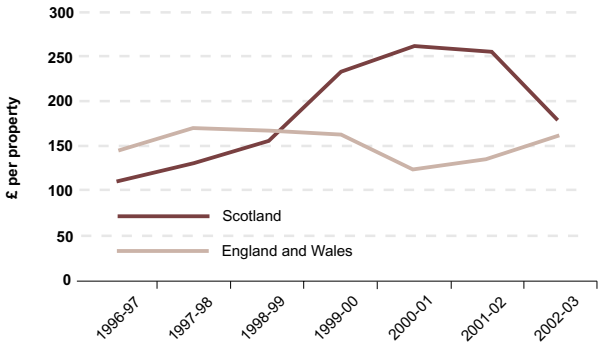
Year	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03
Scotland	£109	£228	£377	£548	£733	£931	£1,083
England and Wales	£144	£310	£477	£643	£768	£904	£1,061
Difference	(£35)	(£82)	(£100)	(£95)	(£35)	£27	£22

Table 3.4 illustrates the impact of adding in the PFI investment, to give the effective level of investment per property since the three former authorities were created.

Table 3.4: Levels of capital investment per property (including PFI)

Year	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03
Scotland	£110	£126	£156	£230	£258	£253	£180
England and Wales	£144	£167	£167	£166	£125	£136	£157
Difference	(£34)	(£41)	(£11)	£64	£133	£117	£23

Figure 3.2 Levels of capital investment per property (including PFI)



Finally, Table 3.5 illustrates the cumulative level of effective investment per property over the same seven-year period. After proper account is taken of PFI, Scotland has invested £251 more per property than has been invested in England and Wales during the period.

Table 3.5: Cumulative levels of capital investment per property (including PFI)

Year	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03
Scotland	£110	£236	£391	£621	£879	£1,131	£1,312
England and Wales	£144	£310	£477	£643	£768	£904	£1,061
Difference	(£34)	(£75)	(£86)	(£22)	£111	£228	£251

3.2 Levels of investment adjusted for efficiency

In the *Strategic Review of Charges 2002-2006*[13], and in our annual *Costs and Performance Reports*[14], we analyse the capital efficiency of the water and wastewater industry in Scotland relative to that in England and Wales.

The analysis of capital expenditure in Scotland outlined in section 3.1 above does not take account of the relatively poor capital efficiency of the industry in Scotland. By 'efficiency' we mean that the same, or a better, investment output is delivered for less money. As such, the actual cash expenditure should be adjusted for inefficiency so that the effect on the level of service, or on environmental and public health standards, can be assessed objectively.

The following table outlines the percentage gap in capital efficiency that was assessed in the *Strategic Review of Charges 2002-2006* and in our *Costs and Performance Reports*.

Table 3.6: Capital efficiency gap relative to England and Wales[15]

Year	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03
East of Scotland Water Authority	23%	27%	30%	34%	37%	36%	n/a
North of Scotland Water Authority	24%	28%	32%	35%	38%	38%	n/a
West of Scotland Water Authority	24%	28%	31%	35%	38%	38%	n/a
Scotland weighted average	24%	28%	31%	35%	38%	37%	36%

[13] *Strategic Review of Charges 2002-2006*, Water Industry Commissioner for Scotland, November 2001.
[14] *Costs and Performance Report 2001-02* and *Costs and Performance Report 2002-03*, Water Industry Commissioner for Scotland, February 2003 and November 2003 respectively.
[15] The gap is assessed in relation to Ofwat's lowest submission for cost base benchmarking. This would understate the extra efficient, effective investment in Scotland per household relative to the Ofwat benchmark. The efficiency targets for Scottish Water in the *Strategic Review of Charges 2002-06* were calculated relative to the less demanding Ofwat benchmark.

In the analysis in the *Strategic Review of Charges 2002-2006*, we assumed that PFI capital investment is delivered efficiently. The following table therefore reconciles actual direct spending in Scotland to the efficient effective investment spending that benefited customers, under the same assumption.

Table 3.7: Reconciliation of direct investment to efficient effective investment

Year	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03
Direct investment in Scotland	£252m	£277m	£346m	£397m	£428m	£460m	£353m
Less: Assessed capital inefficiency	£60m	£78m	£107m	£139m	£163m	£175m	£128m
Efficient direct investment	**£192m**	**£199m**	**£239m**	**£258m**	**£265m**	**£285m**	**£225m**
Investment delivered through PFI[16]	£3m	£15m	£15m	£136m	£170m	£126m	£65m
Total efficient effective investment	**£195m**	**£214m**	**£254m**	**£394m**	**£435m**	**£411m**	**£290m**

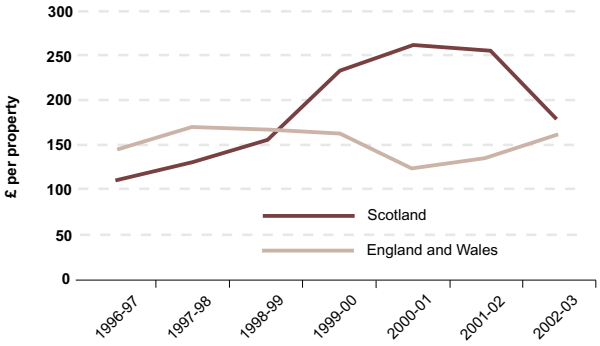
Table 3.8 shows the adjusted total investment in Scotland on a per property basis and compares this with England and Wales. Even after this adjustment for inefficiency, investment in Scotland on a per property basis is broadly on a par with that in England and Wales. It is worth noting that, over the seven-year period, Scottish customers have financed £1,312 of investment per property[17] but, due to inefficiency, have received only £945[18] of efficient effective investment.

Table 3.8: Efficient effective investment per property

Year	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03
Scotland	£84	£92	£109	£170	£188	£177	£125
England and Wales	£144	£167	£167	£166	£125	£136	£157

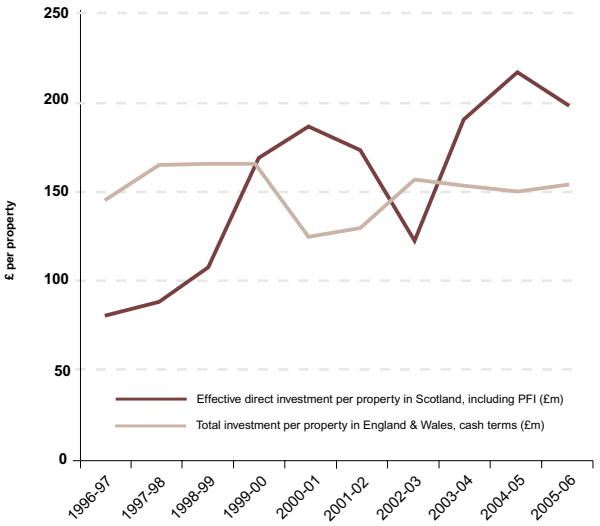
This profile is shown in Figure 3.3.

Figure 3.3 Levels of capital investment per property (adjusted for relative efficiency)



During the remainder of the *Quality and Standards II* period, per property investment is planned to be significantly higher in Scotland. If *Quality and Standards II* is delivered in full, effective efficient investment on a per property basis over the entire 10-year period from 1996 to 2006 will be marginally higher than in England and Wales.

Figure 3.4 Actual and projected investment per property in Scotland and England and Wales



3.3 Longer term investment trends

The analysis set out above has focused on the period from 1996 when the three former water authorities were established. This represents the period for which reliable and consistent information on investment levels in Scotland is available. Information on spending is

[16] This assumes that PFI capital was delivered at benchmark levels of efficiency.
[17] Figure taken from Table 3.5.
[18] Total of efficient effective investment per household in Scotland 1996-97 to 2002-03 taken from Table 3.8.

available for the years before 1996 from the capital account of local authority returns. However, this may understate the true level of investment and maintenance expenditure as it may exclude some asset costs that were charged to the revenue account. That said, it is possible to use the information on capital spending pre-1996 to estimate the long-term profile of investment per property in Scotland over the period from 1985-86 to 2005-06, and to compare this with England and Wales.

The increased investment in England and Wales in the early 1990s took place during the period following privatisation. However, since the mid-1990s, investment per property in Scotland has been significantly higher than that in England and Wales.

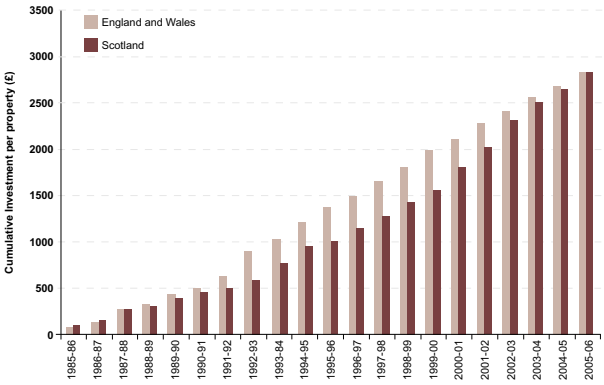
Table 3.9: Historic investment in Scotland and in England and Wales[19]

Year	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92
Annual investment per property in Scotland	£78	£74	£78	£70	£73	£76	£82
Annual investment per property in England and Wales	£69	£74	£82	£89	£92	£119	£154
Variance	**£9**	**£0**	**(£4)**	**(£19)**	**(£19)**	**(£43)**	**(£72)**

Year	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
Annual investment per property in Scotland	£94	£125	£138	£133	£119	£123	£136
Annual investment per property in England and Wales	£185	£177	£159	£136	£138	£161	£181
Variance	**(£91)**	**(£52)**	**(£21)**	**(£3)**	**(£19)**	**(£38)**	**(£45)**

Year	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Annual investment per property in Scotland	£166	£238	£263	£253	£176	£184	£198
Annual investment per property in England and Wales	£178	£172	£127	£136	£153	£147	£139
Variance	**(£12)**	**£66**	**£136**	**£117**	**£23**	**£37**	**£59**

Figure 3.5: Cumulative investment per property in Scotland and England and Wales[20]



On a cumulative basis, investment in Scotland has caught up with that in England and Wales and, over a 10 and 20-year period, is projected to be marginally ahead by the end of the *Quality and Standards II* period.

There appears, therefore, to be no evidence to support the contention that there is a significant backlog of investment in Scotland relative to that in England and Wales due to a lack of capital expenditure. Nor should a lack of funds for investment in recent years be a valid justification for poorer customer service or operational efficiency. Customers in Scotland have paid for, and so deserve, an equivalent standard of service.

3.4 Conclusions and key messages for customers

- Investment per household in Scotland since 1996 is broadly on a par with that in England and Wales, even after the adjustments we have made above.
- Provided *Quality and Standards II* is delivered in full, the amount spent per property in Scotland in 2006 will exceed that in England and Wales over the previous 10 and 20-year periods.
- Inefficiency in the investment programme since 1996 has cost customers in Scotland £896 million (in 2003 prices). This is equivalent to £386 for every property in Scotland[21].

[19] Adjusted for inflation and for the impact of PFI investment. Efficiency adjustment is not included.
[20] Adjusted for inflation and for the impact of PFI investment. Efficiency adjustment is not included.
[21] The total is £367 per property before the adjustment is made to 2003 prices (£1,312 less £945).

- There is no evidence to support the contention that there is a significant backlog of investment in Scotland relative to the position in England and Wales[22] due to a lack of capital expenditure. Although investment in England and Wales was higher immediately after privatisation, the situation has reversed in recent years.

- A lack of funds for investment in recent years would not appear to be a valid justification for either poorer customer service or poorer operational efficiency.

- There has been a downturn in investment in the first year of the *Quality and Standards II* period. We have received assurances from Scottish Water that the *Quality and Standards II* programme will be delivered in full over the remainder of the period.

[22] This assumes that expenditure required to maintain existing assets is broadly similar to expenditure required for new assets.

Chapter 4

The condition and performance of assets

In this chapter we examine the condition and performance of the industry's assets in Scotland, and compare this to the position in England and Wales. We also assess whether poorer condition or performance of the assets could justify a failure to achieve benchmark efficiency.

In asset-intensive businesses, such as water and wastewater (or indeed any utility), informed and robust investment decisions need to be based on accurate and up-to-date knowledge of the asset base of the business. This is fundamental to good practice in asset management.

The regulatory return, provided to us each year by Scottish Water, contains information about both the physical state of the assets (condition) and also the assets' ability to carry out their function (performance).

Asset condition should be monitored continually, so that investment takes place at the point where the costs of ensuring that an asset can perform adequately exceed the annualised costs of replacement or refurbishment. In this way, customer charges over the medium to long term are minimised and service levels are maintained.

Customers have an interest in how well the water industry's assets perform, because performance has a direct and often immediate impact on the level of service to customers, on the environment and on public health.

An asset's performance reflects its ability to fulfil its purpose, and is a function of:

- its condition,
- how it is operated, and
- its capacity to carry out its required role.

It is possible for an asset in reasonable condition and of adequate capacity to perform badly through poor operating practice. Similarly, an asset which is not in the best condition can, through skilful management, be made to perform acceptably.

4.1 Condition of Scotland's asset base

Asset condition is assessed on a scale of 1-5, with 1 representing 'very good' and 5 representing 'very poor'. Appendix 1 gives detailed definitions of what each score means for each asset category.

We have used the information provided in the most recent regulatory returns available to compare the condition of assets in Scotland with those in England and Wales[23].

We have also included regulatory information that Scottish Water supplied to us in June 2002. This allows us to assess any improvement or deterioration over the report year.

For ease of comparison, given some differences in reporting formats between Scotland and England and Wales, we have focused on the four main components of a water and wastewater company's asset base, namely water treatment works, water mains, wastewater treatment works, and sewers. These comprise approximately 80% of the replacement cost of the total asset base.

We show information for the two highest and two lowest performers of the ten English and Welsh water and wastewater companies[24], along with the mean and median for these ten companies. We cannot name the company comparators used from England and Wales for reasons of commercial confidentiality.

We have focused on the percentage of each asset class in condition grades 4 and 5, ie 'poor' and 'very poor', since these are the assets that are potentially more expensive to operate.

Figures 4.1 to 4.4 show the respective position of the Scottish asset base, for this year and last year, in each of the four main asset categories.

[23] Scottish Water Annual Return 2002-03, England and Wales Annual Return 1997-98. Although there is five years' discrepancy between the reporting years, this is a relatively short period for assets with long useful lives, such as pipes and treatment works.
[24] This is the group of companies that provides both water and wastewater services. Other 'single service' companies operate in England and Wales.

Figure 4.1: Water treatment works in condition grades 4 and 5

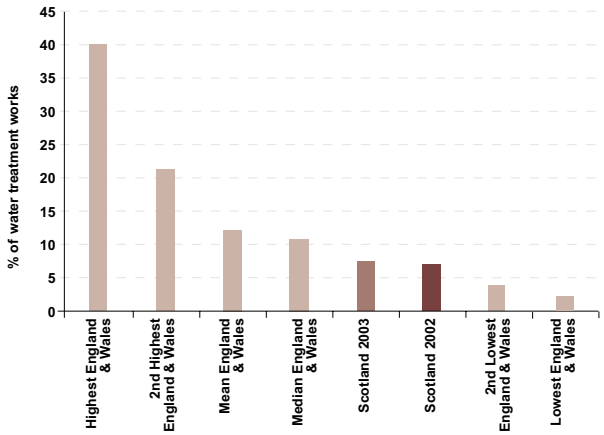


Figure 4.2: Water mains in condition grades 4 and 5

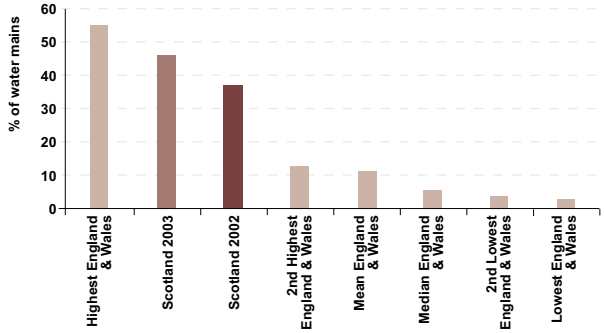


Figure 4.3: Wastewater treatment works in condition grades 4 and 5

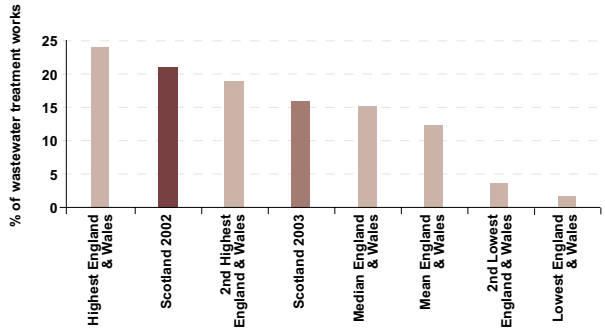
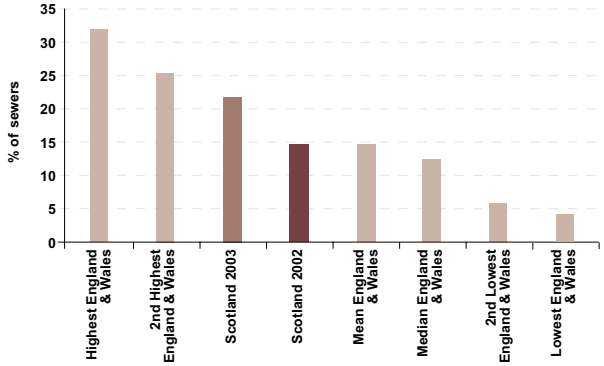


Figure 4.4: Sewers in condition grades 4 and 5



These results indicate that, with the possible exception of water mains, the condition of assets in Scotland remains broadly similar to those in England and Wales. For all asset categories, the percentage of 'poor' and 'very poor' assets in Scotland lies within the range of companies in England and Wales.

Water mains in Scotland, although not in a worse condition than the worst company south of the border, do appear to have the second highest percentage of assets in a 'poor' or 'very poor' condition.

Table 4.1: Scottish Water's relative change in reported condition grades 4 and 5 over report year

	Asset category			
	Water treatment works	Water mains	Wastewater treatment works	Sewers
Percentage in condition grade 4 and 5, 2002	7.0%	37.5%	21.2%	14.3%
Percentage in condition grade 4 and 5, 2003	7.5%	46.0%	16.1%	22.2%
Change	+0.5%	+8.5%	-5.1%	+7.9%

There has been some movement within each category from the information provided to us last year[25]. The reported condition of water treatment works, water mains, and sewers has declined while the condition of wastewater treatment works has improved. Given the relatively long life of the assets, particularly sewers and water mains, it is unlikely that these differences are associated with actual changes in physical condition. Scottish Water has reported that it is making ongoing improvements in the quality of its asset information, and

[25] Information provided by Scottish Water in its June 2002 Annual Return submission for the year 2001-02.

that the changes relate to this improved information quality.

WRc, an independent consultancy, recently assessed the information contained in Scottish Water's asset inventory. We have been advised by Scottish Water that WRc's assessment concluded that the condition and performance grades reported by Scottish Water were, in the main, accurate.

Overall, it remains apparent that the condition of the asset base in Scotland is within the range of condition grades observed in England and Wales. As such, poor asset condition would not appear to justify either poorer customer service or a lack of progress towards benchmark efficiency.

4.2 Performance of Scotland's asset base

Analysis of asset performance is measured using a similar, five-point scale. Here, 1 denotes an 'excellent' asset, and 5 represents a 'failing' asset[26]. Detailed definitions are provided in Appendix 1.

Table 4.2 gives the percentage of the four asset categories that lie in performance grades 4 ('borderline') and 5 ('fail') in Scotland. This is compared with the regulatory information provided to us last year by Scottish Water.

Table 4.2: Scottish Water's relative change in reported performance grades 4 and 5 over report year[26]

	Asset category			
	Water treatment works	Water mains	Wastewater treatment works	Sewers
Scotland 2002	8%	38%	18%	30%
Scotland 2003	10%	18%	12%	12%
Change	+2%	–20%	–6%	–18%

In three of the four asset categories, the reported performance of the assets has improved significantly over the last year, while the performance of water treatment works has slightly deteriorated. Scottish Water has reported that these substantial changes in performance gradings largely result from the use of standard assessment methodologies to replace the different assessment techniques that the three former authorities employed.

For example, Scottish Water reports[27] that the former North of Scotland Water Authority, in its June Return 2002, used the condition assessment of water mains as a substitute for the performance assessment. It asserts that as a result, 62% of the authority's water mains were reported as being in performance grades 4 and 5. For this year's return, Scottish Water has reported this figure as 10%. This is apparently based on Scottish Water's standard methodology for performance assessment.

Similarly, Scottish Water advises[28] that the significant improvement in reported performance for sewers mainly results from the use of a consistent methodology. It notes that in last year's return the former West of Scotland Water Authority adopted an extremely pessimistic approach to performance assessment, resulting in 25% of its sewers being reported as Grade 5 (ie 'failing').

We welcome Scottish Water's efforts to consolidate information sources and adopt standard methodologies. However, we are concerned that more work needs to be done to ensure that information about assets is as complete as possible. For example, Scottish Water has reported[29] that it does not have properly assessed condition and performance information for up to 20% of its assets. This and other shortcomings in the asset inventory will inevitably impact on Scottish Water's ability to make accurate investment decisions and deliver the efficiencies required.

This year will see the introduction of independent reporters. Their scrutiny of Scottish Water's information returns will help to resolve our concerns and ensure that we have better quality information with which to regulate the industry.

[26] A negative number in the change row implies an improvement in the performance of assets in a particular category.
[27] Table H commentary of Annual Return 2002-03, submitted by Scottish Water, June 2003.
[28] Table H commentary of Annual Return 2002-03, submitted by Scottish Water, June 2003.
[29] Table H commentary of Annual Return 2002-03, submitted by Scottish Water, June 2003.

Table 4.3 compares the percentage of assets in performance grades 4 and 5 in Scotland with the England and Wales average.

Table 4.3: Percentage of assets in performance grades 4 and 5

	Asset category			
	Water treatment works	Water mains	Wastewater treatment works	Sewers
Scotland 2003	10%	18%	12%	12%
England and Wales 1999	28%	29%	19%	6%

With the exception of sewers, the percentage of assets in performance grades 4 or 5 is significantly lower in Scotland than in England and Wales. This suggests that overall the asset base in Scotland is performing no worse than that in England and Wales.

For sewers, we highlighted our concerns in last year's report[30] that poor operational policy may be contributing to the poor performance relative to that in England and Wales. As noted earlier, asset condition and operating practices are the two factors that most influence how well an asset performs. Given that the condition of sewers in Scotland is assessed as being broadly equivalent to that in England and Wales, this implies that operational policies could be improved.

We can compare the relative performance grades for water mains that are presented in Table 4.3 with information about the condition of water mains shown in Figure 4.2. This suggests that there may be an issue with the assessment of the condition of the mains. The performance of water mains in Scotland is assessed as being better than that in England and Wales, despite the relatively poor condition reported.

Condition and performance gradings, when properly combined with assessments of risk, provide invaluable evidence about where investment should be targeted to maintain and improve overall network performance. It is imperative that Scottish Water continues to make progress in developing its understanding of both the condition and performance of its assets. This would significantly improve investment decisions, to the benefit of all customers.

[30] Chapter 4, section 4.2, *Investment and Asset Management Report 2000-02*, Water Industry Commissioner for Scotland, March 2003.

Chapter 5

Investment performance in Scotland

In this chapter, we analyse the investment performance of Scottish Water in the first year of the *Quality and Standards II* investment period. We examine progress to date and the extent of the investment outputs that are still to be delivered over the remainder of the *Quality and Standards II* period. Our analysis considers spending against budget, progress with projects and delivery of the agreed benefits for customers.

5.1 *Quality and Standards II*

The Scottish Executive's second *Water Quality and Standards* document[31] was published in August 2001. It defines the planned investment in the water industry in Scotland for the period from April 2002 to March 2006. It also defines high-level objectives for the investment programme, such as targets relating to the extent of the underground water and sewerage networks that will be replaced during the period.

In the *Strategic Review of Charges* we examined the scope for capital efficiency in the *Quality and Standards II* investment programme. It is important to emphasise that by 'efficiency' we mean delivering exactly the same customer, environmental and public health benefits that were envisaged in *Quality and Standards II*, but for less money.

Scottish Water is required to deliver the full scope of *Quality and Standards II* for £1.8 billion. Customers will wish to be assured that this significant investment in Scotland's water industry – which is vital to ensuring that public health, environmental and customer service benefits are delivered – is on track.

However it is also vital that this investment programme is delivered efficiently. It is better for customers that Scottish Water improves its efficiency in capital delivery – even if that leads to some modest delays in the delivery of the *Quality and Standards II* investment programme.

Less improvement in the efficiency of capital expenditure will increase the costs of future environmental, public health or customer service improvements and could make them less affordable.

5.2 Investment performance reporting

Scottish Water reports performance in delivering the investment programme in its annual return and on a project-by-project basis, through its quarterly Capital Investment Returns. We also use the annual return to monitor spending in delivering agreed outputs.

In May 2001, we wrote[32] to the former authorities and asked for a project-level breakdown of their *Quality and Standards II* investment plans. Substantially complete lists were provided by the former North and West of Scotland Water Authorities. The former East of Scotland Water Authority provided a composite list, which we then asked to be broken down further. In the intervening period we have been working with the former authorities and subsequently Scottish Water, along with the Drinking Water Quality Regulator (DWQR) and the Scottish Environmental Protection Agency (SEPA), to finalise this project-level breakdown of the *Quality and Standards II* investment programme.

While progress has been made, and around 90% of the *Quality and Standards II* programme has now been identified at a project level, we are not satisfied with the length of time that this process has taken. We will continue to press Scottish Water for a full project-level description of the *Quality and Standards II* investment programme. As it is responsible for delivering the investment programme, Scottish Water has an obligation to ensure that the relevant stakeholders are provided with a full description of the projects which make up the programme and which deliver the agreed outputs for *Quality and Standards II*.

In particular, the fact that the list of project has not been finalised will not be accepted as a valid justification for non-delivery of *Quality and Standards II*. Most of the projects in the programme were identified towards the end of 2001, well before *Quality and Standards II* started. Customers will expect that the transition team worked to plan the delivery of the *Quality and Standards II* investment programme. Customers will also expect that Scottish Water has taken all possible steps to ensure that the investment programme is delivered efficiently.

[31] *Water Quality and Standards: Investment priorities for Scotland's water authorities 2002-2006.*
[32] *WIC18 Quality and Standards Final Output*, issued by the Water Industry Commissioner for Scotland in May 2001 to the Chief Executives of the three former water authorities. It is reprinted in the *Strategic Review of Charges 2002-2006* (Section 9, Appendix F, page 589).

In the long run improved efficiency will benefit both customer service and public health and environmental compliance by substantially reducing the costs of future investment priorities.

5.3 Expenditure to date on *Quality and Standards II*

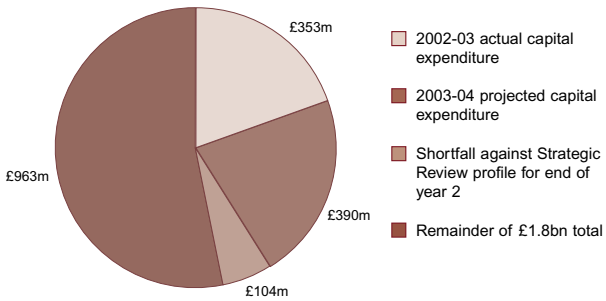
One way to assess Scottish Water's performance in delivering investment is to analyse the amount of money spent against the investment profile set out in the *Strategic Review of Charges*.

Scottish Water's investment expenditure for its first year of operation, 2002-03, is reported in its 2003 Annual Return. To obtain a more up-to-date picture, we also use forecast expenditure information for 2003-04, which was provided by Scottish Water in its Quarter 3 Capital Investment Return (submitted in January 2004). In this way it is possible to assess the likely *Quality and Standards II* investment expenditure over the first two years of the four-year period[33].

Table 5.1: Scottish Water's capital expenditure 2002-06

	2002-03	2003-04	2004-05	2005-06
Year 1 actual and year 2 forecast	£353m	£390m		
Cumulative total	**£353m**	**£743m**		
Strategic Review profile	£436m	£411m	£501m	£463m
Cumulative total	**£436m**	**£847m**	**£1,348m**	**£1,810m**

Figure 5.1: Scottish Water's capital expenditure 2002-06



In 2002-03, £353 million[34] was invested by Scottish Water. This is a significant reduction from the £460 million[35] invested in 2001-02, the final year of operation of the three former authorities.

Over the first two years of the current review period, total expenditure is forecast to be up to £743 million. This is a shortfall of at least £104 million in capital investment compared with the profile of investment set out in the *Strategic Review of Charges*.

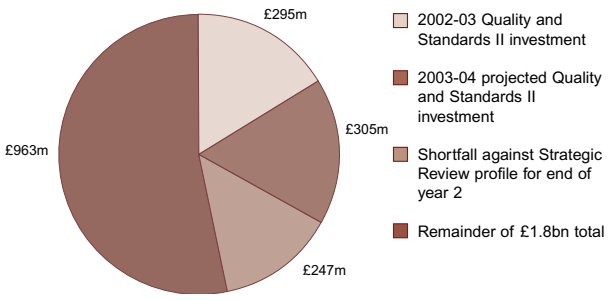
If expenditure is phased in a different way this does not, in itself, jeopardise delivery of the overall investment programme. However, there are clearly significant implications for the level of investment that will now be required during the last two years of the period. These are discussed in more detail below.

Scottish Water's quarterly Capital Investment Return provides a breakdown of expenditure on a project basis. It also allows us to determine whether or not this expenditure relates to projects in the *Quality and Standards II* list as defined by WIC18. As discussed above, the definitive list of projects for *Quality and Standards II* has not yet been fully finalised. It is, however, possible to assess the extent to which the expenditure to date relates to projects that are defined in the current version of the investment programme.

Table 5.2: Assessed extent of *Quality and Standards II* expenditure[36]

	2002-03	2003-04	2004-05	2005-06
Year 1 actual and year 2 forecast	£295m	£305m		
Cumulative total	**£295m**	**£600m**		
Strategic Review profile	£436m	£411m	£501m	£463m
Cumulative total	**£436m**	**£847m**	**£1,348m**	**£1,810m**

Figure 5.2: *Quality and Standards II* expenditure



[33] These numbers exclude any PFI element, estimated at £65 million in 2002-03 (see Chapter 3, Table 3.1).
[34] Excludes any PFI element, estimated at £65 million in 2002-03 (see Chapter 3, Table 3.1).
[35] Excludes any PFI element, estimated at £126 million in 2001-02 (see Chapter 3, Table 3.1).
[36] The assessment is based on Scottish Water's Quarter 3 2003-04 Capital Investment Return.

Total investment in the *Quality and Standards II* programme during the first two years of the period is forecast to be no more than £600 million. There is a significant difference between the forecast capital expenditure of up to £743 million at the end of year 2 of the investment programme and the forecast *Quality and Standards II* investment in the same period of up to £600 million. This requires explanation.

In its Capital Investment Return, Scottish Water stated that it had spent just under £500 million on currently defined *Quality and Standards II* projects. In comparing their spending by project to the WIC18 defined list, we believe that up to £600 million of the investment committed to date may relate to *Quality and Standards II* projects. It is possible that this estimate is too high.

As discussed above, a small element of the *Quality and Standards II* programme remains undefined at a project level. Part of the difference (between £600 million and £743 million) may be explained by these remaining elements. However, it is likely that these additional projects could account for only a very small proportion of the difference of £143 million between what has been spent in total and what may plausibly be regarded as *Quality and Standards II* investment.

If we express this in a different way, around a fifth of Scottish Water's forecast £743 million of capital investment over the two-year period from April 2002 to March 2004 relates to projects that do not form part of the *Quality and Standards II* investment programme. This is a very real concern for customers; they are funding investment from which there are no identifiable *Quality and Standards II* outputs.

Scottish Water has indicated that a significant element of capital expenditure over the last two years has been associated with 'carry over' of *Quality and Standards I* projects that were not completed by the former authorities by April 2002. Scottish Water has previously reported up to £157 million[37] of inherited liabilities relating to projects that had been started, but not completed, by the authorities.

As reported in last year's *Investment and Asset Management Report*[38], the £888 million invested in the *Quality and Standards I* period was consistent with forecast expenditure of £890 million. It is therefore reasonable to assume that all of the obligations under *Quality and Standards I* should have been delivered in full. There is clearly an inconsistency between this assumption and Scottish Water's assertion.

We asked for, and have received, information from Scottish Water to support the £157 million of *Quality and Standards I* inherited liabilities that are being claimed. To date, we have found only limited evidence of expenditure on projects that are not in *Quality and Standards II.*

For customers, the key issue is that *Quality and Standards II* is delivered in full for the agreed sum of £1.81 billion. We will continue to press Scottish Water for a full project-level definition of the *Quality and Standards II* programme. Customers have a right to know how their money is being spent; they also need to know that they are funding only the outputs agreed through the *Quality and Standards* process. Scottish Water has a clear obligation to deliver the defined investment programme to time and to budget.

5.4 Progress in delivering *Quality and Standards II* projects

From Scottish Water's returns, it is also possible to build up a picture of progress in delivering the projects that comprise the *Quality and Standards II* programme.

Scottish Water reports progress with projects in a series of standard milestones. These range from recognition that there is a need for the investment through to achieving 'beneficial use', at which point the project is delivering the output required in *Quality and Standards II.*

The proportion of projects at each of the key milestones is shown in Table 5.3. This reflects the position reported by Scottish Water in the capital investment return submitted in January 2004. The 'unallocated' line relates to the element of the programme that is not yet fully defined at a project level.

[37] From Scottish Water's response of 5 March 2003 to letter *WIC 32* sent by the Water Industry Commissioner on 11 February 2003.
[38] *Investment and Asset Management Report 2000-02*, Water Industry Commissioner for Scotland, March 2003.

Table 5.3: *Quality and Standards II* project progress

Current project status	Number of projects	2002-06 total spend (forecast)	Percentage of total programme spend	Cumulative percentage of total programme spend
Unallocated	-	£143m	7.9%	7.9%
Investment need recognised	2,517	£824m	45.5%	53.4%
Feasibility study underway	729	£263m	14.5%	67.9%
Option development underway	69	£66m	3.7%	71.6%
Costs approved and tender being awarded	190	£346m	19.1%	90.7%
Project completed to permit beneficial use	322	£168m	9.3%	100%
All projects	**3,827**	**£1,810m**	**100%**	

Fewer than 10% of the projects that comprise the *Quality and Standards II* programme have been completed to the beneficial use stage and, of the £1.81 billion total spend, less than 30% by value has passed the financial authorisation stage. Also, half of the programme has not reached the initial feasibility study milestone.

Given that this analysis reflects the physical delivery position of *Quality and Standards II* just three months prior to the half-way point in the programme, a considerable increase in activity will clearly be required in the last two years of the period.

Scottish Water reports that delays in the physical delivery of the programme are associated with the establishment of its joint-venture delivery team, Scottish Water Solutions. Responsibility for delivering the *Quality and Standards II* programme however remains with Scottish Water and customers will expect the full programme to be delivered to budget by April 2006.

Figure 5.3: *Quality and Standards II* progress to date, by project status

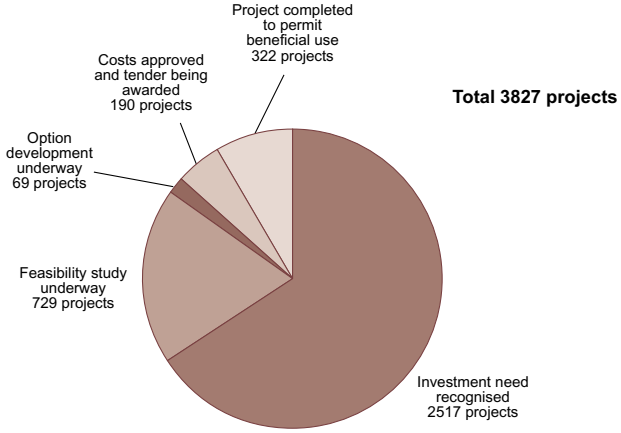
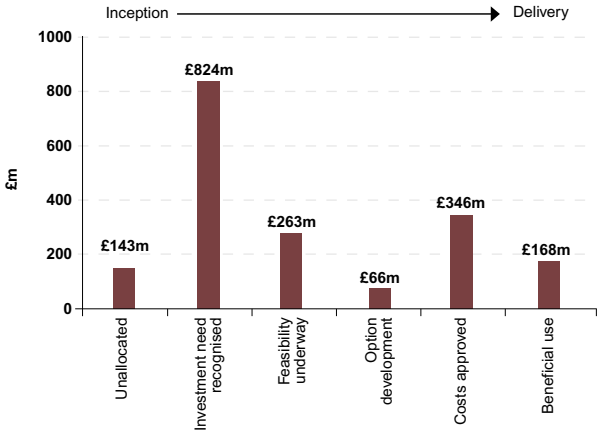


Figure 5.4: Project value at each key milestone



Poor delivery will have an adverse impact on water quality, environmental and customer service enhancements. It will also impact upon Scottish Water's ability to achieve much needed operating efficiency improvements.

Customers will also rightly expect that Scottish Water has taken all possible steps to deliver the outputs required by *Quality and Standards II* as timeously and as efficiently as possible.

5.5 Delivery of *Quality and Standards II* outputs

It is possible to chart Scottish Water's progress in delivering the *Quality and Standards II* outputs that were described in section 5.1 above. Information on the delivery of outputs is contained in Scottish Water's Annual Return, but not in its quarterly Capital Investment Return. As a result, the progress reported here relates to the position in April 2003, at the end of the first year of the investment period.

Progress in replacing water mains and sewers

Replacing worn out water mains and sewers is a vital element of *Quality and Standards II* and brings a range of benefits for customers. These include fewer interruptions to service, better water quality, less sewer flooding and less environmental damage. If deteriorating customer service is to be avoided, it is essential that the elements of the *Quality and Standards II* programme that relate to replacement of the underground network are delivered in full and to budget.

Table 5.4 indicates progress to date in replacing water mains and sewers.

Table 5.4: Progress in replacing water mains and sewers during 2002-03

	Quality and Standards II target	Completed to date	Percentage of target completed by April 2003
Length of water main to be relined/replaced	3,051km	454km	15%
Length of sewer to be rehabilitated	446km	60km	13%

Clearly, delivery during the first year was slow. It was also well below the 25% completion rate that would be expected if the work were to be delivered on a pro-rata basis.

Progress in delivering quality outputs

Progress in delivering two of the key water quality and environmental targets for *Quality and Standards II* is shown in Table 5.5.

Table 5.5: Progress in delivering quality outputs

Parameter	Position in Year 2000	Current position	*Quality and Standards II* target 2006
Population receiving secondary treatment	48.8%	92.7%[39]	93.3%
Drinking Water Quality 1000 index	966.0	970.9[40]	985.0

The proportion of the population that receives secondary sewage treatment has increased significantly since 2000. It has now almost reached the *Quality and Standards II* target. This is mainly because of the nine large PFI-funded wastewater treatment works that have come on stream since 2000. This is an important improvement for customers and brings significant environmental benefits. We welcome this achievement; however, much remains to be done to improve the overall environmental performance of wastewater treatment works in Scotland.

For water quality, the 1000 index covers regulatory compliance at customers' taps with 10 key drinking water parameters. The closer the figure is to 1000, the better the quality of the water. The index is gradually improving, but more progress is needed to reach the targets outlined in *Quality and Standards II*.

5.6 Delivery of the remainder of the *Quality and Standards II* programme

In sections 5.3 to 5.5 we reported on Scottish Water's performance to date in delivering *Quality and Standards II*. Clearly, it is also important to establish the extent of the programme that remains to be delivered over the rest of the investment period.

In general, capital investment in utilities cannot be 'ramped up' quickly and efficiently. This is because of a number of factors, including:

- the need to set up additional delivery teams in order to increase production;
- the time it takes to train new staff;
- the limited capacity within the engineering contracting industry, both locally and across the UK;
- the likelihood of 'bottlenecks' occurring within areas of work that provide support services, such as legal, planning and procurement.

As reported in section 5.3, Scottish Water is forecast to have delivered up to £743 million of expenditure, of which perhaps £600 million is *Quality and Standards II* investment, by the end of the financial year 2003-04. This leaves £1,210 million of *Quality and Standards II* investment to deliver in the remaining two years of the period. This is a 63% increase on the level of expenditure that was achieved in the first two years[41].

Table 5.6: Forecast remaining *Quality and Standards II* investment

	Total expenditure 2002-03 - 2003-04	*Quality and Standards II* expenditure 2002-03 - 2003-04	Remaining expenditure 2004-5 - 2005-06	Percentage increase required
Scottish Water actual and forecast	£743m	£600m	£1,210m	63%
Strategic Review profile	£847m	£847m	£963m	14%

The profile of investment set out in the *Strategic Review of Charges* proposed that £847 million would have been invested by the end of 2003-04, leaving £963 million still

[39] As reported in Table A4 of the Annual Return for 2002-03, submitted by Scottish Water in June 2003.
[40] Figure calculated by Drinking Water Quality Regulator for calendar year 2002 (not financial year). This is not collected as part of the economic regulation reporting regime at present.
[41] This figure assumes that the required increase is based on the total expenditure during the first two years. A more pessimistic assumption would be that the increase should be based on the extent of *Quality and Standards II* delivery during the first two years. This would give a required increase of 102%.

to be delivered. This represents an increase of just 14% over the last two years.

The impact of Scottish Water's delay in delivering the *Quality and Standards II* investment programme over the first two years is that a significant ramp up in expenditure is required over the remainder of the period. The longer delivery is delayed, the harder it will become for the required investment to be delivered timeously and efficiently.

This impacts on customers in two ways, by:

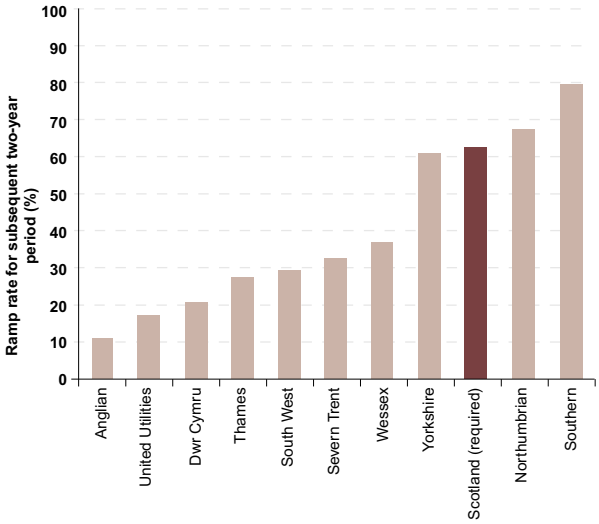
- significantly increasing the risk that *Quality and Standards II* outcomes will not be delivered;
- reducing the likelihood that efficiencies required in both capital investment and operating expenditure are achieved.

Efficiencies in capital investment are associated with improved processes for strategic planning, investment appraisal and innovation. The ability to achieve these efficiencies is inevitably reduced if, at the same time, a major increase in delivery activity is underway.

Operating efficiencies are also impacted by reduced investment. For example, failure to deliver the mains renewal programme will impact on the operating costs incurred in repairing burst and leaking pipes.

To assess the scale of the task that Scottish Water now faces, we have gathered information on the highest investment ramp rates achieved by the companies in England and Wales. We examined the ten-year period from 1992-93 to 2001-02 when investment in England and Wales was increasing rapidly following privatisation. For each company, we have established the maximum ramp rate achieved over any subsequent two-year period.

Figure 5.5: Maximum historical investment ramp rates



This analysis indicates that the percentage increase in investment now required in Scotland to deliver *Quality and Standards II* is close to the highest level achieved in England and Wales by any of the privatised water and wastewater companies in the last ten years.

Similarly, it is useful to examine the increase in investment level required to deliver *Quality and Standards II* and to compare this with what has previously been achieved by the privatised companies in England and Wales.

Table 5.7: Maximum two-year increase in investment, by company

Company	Maximum historical investment ramp rate for subsequent two-year period	Initial two-year investment total	Following two-year investment total	Increase in investment for two-year period
South West	29%	£251	£324	£73
Wessex	37%	£213	£292	£79
Anglian	11%	£724	£806	£82
Dwr Cymru	21%	£486	£590	£104
United Utilities	17%	£947	£1,112	£165
Northumbrian	67%	£337	£562	£225
Thames	27%	£831	£1,058	£227
Yorkshire	61%	£486	£784	£298
Southern	79%	£375	£673	£298
Severn Trent	33%	£951	£1,264	£313
Scotland (required)	**63%**	**£743**	**£1,210**	**£467**

The increase in investment that is required in Scotland, at £467 million, is almost 50% greater than the highest level of investment achieved by any company south of the border (Severn Trent, at £313 million). This is clearly a stretching target.

It is evident that, as a result of the slow progress to date, Scottish Water now faces a considerable challenge in delivering the remainder of the *Quality and Standards II* investment by April 2006. It has, however, provided us and other stakeholders with assurances that it will deliver the programme to time and budget. The customer interest would prioritise 'budget' over 'time'.

5.7 Summary and key messages for customers

- *Quality and Standards II* gives customers and other stakeholders increased transparency about what will be delivered. This allows us to monitor progress and helps ensure that customers receive value for money.

- Most of the projects associated with the *Quality and Standards II* programme have been defined since before the creation of Scottish Water. Ongoing work to finalise the last elements of the project programme will not be accepted as a valid justification for non-delivery of *Quality and Standards II*.

- In 2002-03, Scottish Water's first year of operation, £353 million[42] was invested. This is a significant reduction from the £460 million[43] achieved in 2001-02, the final year of the three former authorities.

- In its January 2004 investment return, Scottish Water forecast that, at the end of year 2 of the programme, there will be a shortfall of some £104 million in capital expenditure against the *Strategic Review of Charges* profile.

- Based on the information provided to us, we estimate that not more than £600 million, around four-fifths, of the up to £743 million capital expenditure over the two-year period from April 2002 to March 2004 will relate to projects that form part of the *Quality and Standards II* investment programme. This is of very real concern to customers who are funding extra expenditure for which there are no identifiable *Quality and Standards II* outputs.

- This means that Scottish Water still has to deliver £1,210 million of outputs defined by *Quality and Standards II*.

It will be a significant challenge to deliver investment efficiently at such an accelerated rate.

Firstly, only two companies south of the border have ever increased investment at a similar rate and no company has successfully increased actual capital spending by the cash amount required.

Secondly, the latest available information from Scottish Water suggests that £967 million of the *Quality and Standards II* capital programme (53%) has not progressed beyond the project feasibility stage. Nearly half way through the investment period, less than 10% of the projects that comprise the *Quality and Standards II* programme have been completed to the point where customers are receiving the benefits of the investment. And of the £1.81 billion total spend, less than 30% has passed the financial authorisation stage.

[42] Excludes any PFI element, estimated at £65 million in 2002-03 (see Chapter 3, Table 3.1).
[43] Excludes any PFI element, estimated at £126 million in 2001-02 (see Chapter 3, Table 3.1).

Chapter 6

Conclusions

Efficient and effective delivery of the *Quality and Standards II* programme is essential if customers are to benefit from the better water quality, environmental improvements and higher service standards for which they have paid.

Our analysis of investment levels, the condition and performance of the industry's assets and the delivery of *Quality and Standards II* has highlighted a number of key issues for customers.

- The size of the network, the condition of the assets, and the level of investment are broadly similar to those in England and Wales.

  - The condition and performance of the assets in Scotland remains no worse than in England and Wales and cannot be used to justify poor customer service.

  - There appears to be no evidence to support the contention that there is a significant backlog of investment in Scotland relative to England and Wales due to a lack of capital expenditure. Although investment in England and Wales was higher immediately after privatisation, the roles have reversed in recent years. By the end of *Quality and Standards II*, Scotland will have invested more per property than England and Wales over a 10-year and a 20-year period.

  - The effectiveness of this level of investment is however being reduced by inefficiencies in the delivery of capital projects. Since 1996 this inefficiency has cost £896 million or £386 for every property in Scotland.

- Delivery of the *Quality and Standards II* investment programme is off to a slow start. This delay will impact on much needed improvements to water quality, environmental standards and customer service.

  - Most of the projects associated with the *Quality and Standards II* programme have been defined since before the creation of Scottish Water. Ongoing work to finalise the last elements of the project programme will not be accepted as a valid justification for non-delivery of *Quality and Standards II*.
  - In 2002-03, Scottish Water's first year of operation, £353 million[44] was invested in the network. This is a significant reduction from the £460 million[45] achieved in 2001-02, the final year of the three former authorities.

  - Based on the information provided to us, we estimate that not more than £600 million, around four-fifths, of the forecast up to £743 million of capital expenditure over the two-year period from April 2002 to March 2004, will relate to projects that form part of the *Quality and Standards II* investment programme. This is of very real concern to customers who are funding this extra expenditure for which there are no identifiable *Quality and Standards II* outputs.

  - Nearly half way through the investment period, less than 10% of the projects that comprise the *Quality and Standards II* programme have been completed to the point where customers are receiving the benefits of the investment. More than half have not yet passed the early design stages.

  - The longer projects are delayed, the harder it will become to deliver the programme efficiently. The rate of increase in delivery required over the last two years of the *Quality and Standards II* period is approaching the highest ever achieved in the water industry since 1992. The required increase in actual capital expenditure committed is without precedent.

- Ongoing investment in water and wastewater assets is required to maintain the current level of service to customers and to accommodate much needed improvements to water quality, the environment and customer service standards.

An important role of regulation is to ensure that customers have clear information about what they have the right to expect and about how Scottish Water is performing. We will therefore continue to monitor, and report on, Scottish Water's performance in managing its assets and delivering investment.

[44] Excludes any PFI element, estimated at £65 million in 2002-03 (see Chapter 3, Table 3.1).
[45] Excludes any PFI element, estimated at £126 million in 2001-02 (see Chapter 3, Table 3.1).

Appendix 1

Asset condition and performance grades

This appendix provides detailed definitions of the asset condition and performance grades reported on by the former three authorities, and now Scottish Water, in their annual returns to our office.

The definitions are consistent with those that Ofwat requires the companies in England and Wales to use for reporting on the state of their assets.

Asset condition grades

Water mains

Condition grade	General meaning
1 Very good	Modern pipe material designed to current standards with no evidence of internal or external degradation. No bursts have occurred.
2 Good	As condition 1, but not designed to current standards in respect of pressure ratings, design specification or corrosion protection. Deterioration causing minimal influences on levels of service. There is less than 1 burst/km/yr of main.
3 Adequate	Water mains, sewage or sludge pumping mains are generally sound. However, a few pipewall or joint failures or evidence of some external or internal degradation. Some deterioration beginning to be reflected in levels of service. There are less than 3 bursts/km/yr of main.
4 Poor	Water mains, sewage or sludge pumping mains with a significant level of joint failures or evidence of significant external or internal degradation or likely to cause a marked deterioration in levels of service. Some asset replacement or rehabilitation needed within the medium term. There are between 3 and 5 bursts/km/yr.
5 Very poor	Unsound water mains, sewage or sludge pumping mains with extensive pipe failures, or significant external or internal degradation. There are more than 5 bursts/km/yr.

Sewers

Condition grade	General meaning
1 Very good	No structural defects.
2 Good	**For brick sewers** (< 3 ring) Minor cracking or no deformation or loss of bricks **and** mortar loss confined to surface **and** line and level as built **and** connections satisfactory. **For other sewers** Circumferential cracking **or** moderate joint defects.
3 Adequate	**For brick sewers** Deformation 0-5%, no fracture and only moderate mortar loss **or** displaced bricks **or** total mortar loss without other defects **or** occasional defective connections. **For other sewers** Deformation 0-5% and cracked **or** fractured **or** longitudinal/multiple cracking **or** occasional fractures or severe joint defects **or** minor loss of level **or** badly made connections.
4 Poor	**For brick sewers** Deformation 5-10% and fractured **or** total mortar loss **or** small number of missing bricks or displaced/hanging brickwork **or** moderate loss of level **or** frequent badly made connections or dropped invert. **For other sewers** Deformation 5-10% and cracked **or** fractured **or** broken **or** serious loss of level.
5 Very poor	**For brick sewers** Already collapsed **or** deformation > 10% and fractured **or** extensive areas of missing bricks **and/or** displaced/hanging brickwork or missing invert. **For other sewers** Already collapsed **or** deformation > 10% and cracked or fractured or broken **or** extensive areas of missing fabric.

Classification for civil structures and buildings' sub-assets

Condition grade	General meaning
1 Very good	Sound modern structure, well maintained in 'as new' condition.
2 Good	Sound modern structure, well maintained, but showing signs of minor wear and tear and/or deterioration of surfaces. No evidence of corrosion in structural steel components.
3 Adequate	Functionally sound structure but appearance affected by minor cracking or staining, but no leakage to/from vessels with potable water. Buildings have more than superficial wear and tear as columns are affected by rust staining, minor cracking of brickwork or masonry, with barely adequate pointing. Minor leakage to/from vessels not containing potable water.
4 Poor	Structure functioning and just safe but with problems due to significant leakage, cracking, spalling, loss of stability or deformation. Buildings have roof leaks, rising damp, rotting structural woodwork, decayed brickwork or pointing. Corrosion substantially reducing size of structural member(s). Danger of contamination of potable water.
5 Very poor	Out of commission because unsafe to use, corrosion causing significant reduction in size of structural member(s) and overstressing, contamination of potable water has been a serious problem.

Asset performance grades

Water mains

Performance grade	General meaning
1 Excellent	Smooth bored mains and communication pipes not subject to corrosion or with sound factory applied linings, no operational performance problems.
2 Good	As 1, but with loose deposits that are noticeable under abnormal flow conditions, slight tuberculation which may give a rough surface, but does not substantially reduce the cross-sectional area of the pipe. May require routine flushing or air scouring.
3 Moderate	Some problems with loose deposits or deterioration of linings leading to occasional complaints. Risk of quality failure. Pipe with tuberculation causing up to 20% blockage by encrustation.
4 Borderline	Frequent problems causing complaints, water quality known to have failed on more than one occasion under normal operating conditions during previous 12 months. Mains with tuberculation causing 20-40% blockage by encrustation.
5 Fail	Mains suffering severe problems of infestations and loose deposits. Water quality cannot be ensured. Mains with tuberculation causing > 40% blocking by encrustation.

Note: For water mains, references to water quality do not apply to potable water.

Sewers

Performance grade	General meaning
1 Excellent	Properly designed, with self-cleansing velocity, no deposition or operational performance problems.
2 Good	As 1, but with sliming or minor deposition causing some hydraulic loss of pipe capacity.
3 Moderate	Sewers with some sliming and deposition, minor backfalls causing loss of pipe capacity and surcharging of sewer at times of peak flow.
4 Borderline	Sewers which need to be occasionally cleaned out to prevent blockages, blockages within sewer occurring less than 1 in 5 years due to silting, which can lead to external flooding of property.
5 Fail	Sewers requiring excessive desilting, or other excessive maintenance to prevent flooding of property or premature operation of storm overflows.

Above-ground assets

Performance grade	General meaning
1 Excellent	Meets all design and statutory requirements at all times and under all demand conditions. Meets authority's internal standards at all times in terms of performance.
2 Good	As 1, but shows minor performance shortcomings in non-critical aspects or under extreme demand or climatic conditions.
3 Moderate	Asset meets all statutory and performance criteria under all normal conditions, but has minor shortcomings under extreme operational or climatic conditions.
4 Borderline	Performance or operational shortcomings have a significant effect on asset function/effectiveness when capacity exceeds 115% of average throughput or major shortcoming on one or more key aspects.
5 Fail	Substantially incapable of meeting externally imposed and authority's internal standards except under normal or reduced operating conditions.

Wastewater treatment works

Performance grade	General meaning
1 Excellent	Hardly ever has a sanitary determinant failure and no more than 20% of look-up table allowance where more than 100 samples are taken per year. No non-sanitary failures.
2 Good	More than 20% and less than 50% of look-up table allowance for sanitary determinant failures. No non-sanitary failures.
3 Moderate	Some cause for concern. More than 50% of look-up table allowance for sanitary determinant failures, but still a slight margin for further failures before becoming borderline (Grade 4). No non-sanitary failures.
4 Borderline	Cause for concern, due to isolated, but explainable breaches of the consent. The next failure of sanitary determinant will cause failure of consent. No non-sanitary failures, although there is less than 5% margin on any one determinant during the last year.
5 Fail	Recurrent consent failures on either sanitary or non-sanitary determinants or exceedance of discharge rate.

Sewage treatment works

Performance grade	General meaning
1 Excellent	Hardly ever has a sanitary determinant failure and no more than 20% of look-up table allowance where more than 100 samples are taken per year. No non-sanitary failures.
2 Good	More than 20% and less than 50% of look-up table allowance for sanitary determinant failures. No non-sanitary failures.
3 Moderate	Some cause for concern. More than 50% of look-up table allowance for sanitary determinant failures, but still a slight margin for further failures before becoming borderline (Grade 4). No non-sanitary failures.
4 Borderline	Cause for concern, due to isolated, but explainable breaches of the consent. The next failure of sanitary determinant will cause failure of consent. No non-sanitary failures, although there is less than 5% margin on any one determinant during the last year.
5 Fail	Recurrent consent failures on either sanitary or non-sanitary determinants or exceedance of discharge rate.