

13. Quality, environmental and service improvements

- Our price limits include, either in full or in part, most of the quality and environmental schemes included in companies' business plans which received ministerial support.
- We expect improvements at 227 water treatment works and replacement, relining or cleaning of 22,000 km of distribution mains to achieve compliance with drinking water standards.
- We expect cleaner effluent from 1,043 sewage treatment works, and improvements to 2,005 intermittent discharges leading to less pollution of the environment.
- A programme of nearly £1 billion to safeguard homes against the risk of sewer flooding. This would resolve or mitigate every known high-risk problem of internal flooding from overloaded sewers where companies' plans said action is needed by 2010. By then, the proportion of properties at risk would reduce to 0.01% of households.

13.1 Quality and environmental improvements

A considerable proportion of the £17 billion capital investment programme will contribute to preserving or enhancing the environment. Expenditure on capital maintenance discussed in chapter 11 is critical to maintaining existing achievements. This chapter considers the programme of work to deliver the further drinking water quality and environmental improvements that companies are expected to deliver in 2005-10. Our price limits include over 3,900 projects and assume capital expenditure of £5.5 billion to deliver this quality improvement programme.

This programme deals with three key areas:

- improvements to water service assets, to deliver drinking water quality improvements and other obligations;
- alterations to water service assets to alleviate the environmental impact of providing a water service; and
- improvements to sewerage service assets to deliver environmental and other new obligations.

Since submission of companies' final business plans, there have been extensive discussions between Ministers, quality regulators, other stakeholders and ourselves on the appropriate level of quality improvements expected from the water companies. These improvements arise from European and national legislation as well as established and developing Government policy. The companies also need to extend and enhance their asset systems to meet the requirements of current legislation; for example, fitting water treatment plant to reduce nitrate levels as a result of agricultural pollution, and also meeting householders' applications to be connected to the public sewerage system. We are encouraging companies to deliver work which gives multiple benefits.

In the principal guidance from the Secretary of State in March 2004 (and the corresponding guidance from the Welsh Assembly Government), Ministers set out the need for a substantial programme of quality and environmental improvements. In England, Ministers also asked Defra officials to carry out a regulatory impact assessment (RIA), using costs included by the companies in their final business plans, for projects in five policy areas. The final guidance for England (October 2004), confirmed that Ministers wanted this work to proceed following the outcome of the RIA.

Generally, the final guidance confirmed the decisions in the principal guidance from March 2004, with developments in two areas. First, Ministers wished the final programme to take account of work required as a result of further advice given to the companies on the security of the water supply systems. Second, although water companies may be required to carry out work to reduce licensed abstraction to alleviate its impact on the environment, the costs of the replacement water sources should not be included directly in the final price limits. Companies should recover the costs through the compensation route already laid down in the Water Resources Act.

Final guidance for Wales confirmed the programme of work supported in March 2004, along with the security advice and the treatment of changes in abstraction licences outlined above.

The Environment Agency and the DWI gave us their revised views on the quality enhancement programme needed to deliver the ministerial guidance for both England and Wales. An outline of the programmes is given in chapter 8.

We have reviewed companies' plans, and any changes since April. All the proposals that we have included in price limits meet the following criteria:

- they are required by the quality regulators, and confirmed by Ministers, or are new obligations under current legislation;
- they deliver a measurable defined output, which is enforceable;
- they have a clearly defined timetable and due date for delivery in line with regulations or other legislation;
- they have defined asset improvements or changes to operational procedures to deliver the output; and
- they have identified costs for the proposed solution which have been challenged and validated by the company's reporter.

After reviewing the scope of the programme, we also scrutinised and, where appropriate, challenged the companies' costs. Where there was sufficient volume of work across several companies, we reviewed the unit costs of improvements and used our own assumptions for companies whose costs were comparatively high. We have reviewed the cost of ammonia and phosphate removal as well as proposals for first time sewerage and intermittent discharge improvements. We challenged three companies with outlier costs for first time sewerage, one for intermittent discharges and one for phosphate removal. For the latter, we applied our assumptions to both the capital and operating costs.

For other policy areas we found that the outcome of the cost base comparative analysis provided a reasonable comparison to use to challenge and compare companies' costs. We have applied catch-up and continuing efficiencies for both water and sewerage as explained in chapter 10.

Table 33 summarises the capital costs of the quality improvement proposals in companies' business plans alongside our assumptions for price limits. Our assumptions for the quality programme have led to an increase of over £430 million compared with our draft determinations. This change is mainly due to extensive work carried out by the quality regulators and the companies since August to define the work expected and the asset improvements needed to deal with quality problems. More projects now meet our criteria for inclusion in price limits. This table also includes our estimate of an extra £1.5 billion to cover projects or new obligations that may be confirmed or placed on companies before 2010. This is in addition to the £5.5 billion programme included in price limits.

English Nature and the Countryside Council for Wales will be making progress on the review of abstraction licences and discharge consents in line with the Habitats Directive. We expect some improvements to intermittent discharges from the sewerage system in United Utilities to be confirmed as reasonable solutions to environmental problems. Many of the investigations identified for the periods 2000-05 and 2005-10 will be completed and any solutions to alleviate the environmental impacts will need to be implemented promptly. The forthcoming directives for bathing water quality and preliminary work for the Water Framework Directive may lead to work programmes being eligible for inclusion in interim determinations of prices between 2005 and 2010. The actual amount of additional improvement will depend on the timing of new legislation, and the extent of any further work required to meet existing as well as new obligations.

Since the draft determinations we have also reviewed our approach to dealing with the additional costs of operating the new assets resulting from the 2000-05 quality improvement programme. For projects completed towards the end of 2004-05, the full impact of the operating costs will not arise until the beginning of the 2005-10 period. We informed companies of the challenge to their forecasts in 1999. However, some companies believed that we were unduly harsh in applying the 1999 efficiency factors for this work. They believe we should use the efficiency factors assumed for this price review.

We have therefore reviewed these additional operating costs for all companies. Where companies have included additional operating costs for completing the 2000-05 programme we have reviewed these alongside our recalculated profile. We have used the incremental additional operating costs after April 2004, adjusted for any changes due to revisions to the programme by interim determinations, or the logging up/down and shortfalls processes. We applied the 1999 challenge and other efficiency factors for 2004-05, with our new efficiency factors from the start of 2005. Where companies' forecasts were greater than our calculations, we have capped their estimates to our projections. We capped seven companies for the water service and six for the sewerage service. We reviewed the additional operating costs put forward by the smaller water only companies, but did not cap them. The differences are chiefly due to phasing.

Table 33 The capital programme for quality improvements for 2005-10

Drinking water, environmental and other new obligations	Companies' business plans	Our assumptions in final determinations
	Quality capital improvement expenditure (£m)	Quality capital improvement expenditure (£m)
Drinking water – improvements to water treatment works and distribution mains to improve drinking water quality. Also changes to assets to improve security and water supply in emergencies.	2,144	2,066
Environmental impact – dealing with the adverse effects of water abstraction on nature conservation sites and biodiversity	140	34
Improving the impact of the sewerage service on the water environment by: <ul style="list-style-type: none"> • Carrying out Environment Agency work identified for 2005-10 with ministerial support and other new work identified for 2005-10 • Completing the 2000-05 programme – some projects now have revised outputs and timescales 	3,934	2,860
	559	888
Policies reviewed by Ministers after the Regulatory Impact Assessment in England: <ul style="list-style-type: none"> • Consumer acceptability of drinking water • UK Biodiversity Action Plan • Endocrine disrupters research project • Land management projects • Local priority schemes 	304	220
Costs before synergies and efficiencies	7,080	6,068
Synergies and efficiencies assumed for 2005-10	(228)	(556)
Current quality improvement programmes – post-efficiency	6,852	5,512
Improvements, most supported by Ministers, where the output is not yet well defined, or appraisal of options to deliver outputs have not been completed – progress estimated in 2005-10		Up to 500
Estimate of other new obligations which may arise during 2005-10		Up to 1,000
Range for possible final quality improvement programme for 2005-10		£5.5 billion to £7 billion

13.2 Drinking water quality improvements and other new obligations

The drinking water quality programme is summarised in table 34. This includes enhancement of treatment works to achieve new standards, or to maintain existing ones where there is a deterioration in the quality of the water abstracted. Companies are also reaching the end of the 20-year programme of work that began at privatisation to deal with discoloured water and the condition of the distribution mains.

We are concerned about the work required to reduce nitrate levels in the public water supply. This does not follow the 'polluter pays' principle, as water companies' customers will be paying for water treatment to remove pollution caused by others. However, this treatment is needed both to meet quality standards and for public health. We are disappointed that it has not been possible for the companies to identify in all cases alternative water sources to blend public water supplies so that this treatment is not required. We welcome the DWI and the Environment Agency's initiative in working with companies to review the options for blending, prior to confirming that these treatment schemes are necessary. Nitrate reduction is an energy intensive process and in most instances blending is a more sustainable option. We hope that, in the longer term, this problem will be controlled by diffuse pollution measures and that replacement of new treatment plants will not be required at the end of their useful life in 20-30 years' time.

The companies are still in the process of considering treatment methods to optimise reductions to lead levels at customers' taps. This is a lengthy and comprehensive process. Once optimisation is achieved, the DWI will be in a position to review and confirm whether additional strategic lead pipe replacement programmes are needed in the latter part of 2005-10. However, any programme of replacing company-owned lead pipes will be expensive and disruptive. Delivering substantial reductions in lead levels will also require customers to replace their lead pipework, at significant cost to individual households. Pipe replacement carried out by companies will only reduce lead levels at the tap to a limited extent unless customers also replace their pipework.

In 1989, most companies started a programme of work to improve the colour and appearance of water at customers' taps. Most companies have now finished this quality-driven mains renovation. The remaining seven companies will be completing their programme of work during 2005-10. In our draft determinations we assumed that three companies with severe pressure on customers' bills at the start of the 2005-10 period would reschedule this work, weighting it towards the end of the period. This would have alleviated the scale of customers' bill increases. The DWI has made strong representations that the later timetable for mains renovation work is not acceptable. We have therefore assumed the original profile for activity. The impact on bills in our final determinations reflect this decision.

Companies included over 350 projects to enhance the water service in their business plans as part of the quality programme. The number of projects required has increased since our draft determinations. Some of these projects are planned to deliver more than one output supported by DWI or Ministers. For individual policy drivers, companies put forward 303 improvements to deal with drinking water quality in their business plans. In our draft determinations we did not include a number of projects because they did not have the technical support of the DWI, or the outputs and activity were insufficiently defined. We have received more information since August and have reconsidered all previously excluded projects against our criteria.

A further 12 projects to deliver improvements to drinking water quality, including four previously considered as maintenance, are included in our final determinations as quality improvement projects.

We have included all the schemes supported by the DWI, either as part of the quality programme, or as part of the companies' maintenance programmes.

We included 76 of the 82 proposals companies included in their plans to enhance the security of their assets. Those excluded had not been fully justified or explained.

We also reconsidered the funding of projects to clean the water distribution system. Where defined cleaning outputs are specified by the DWI to complete the major programme of work to renovate and refurbish the distribution system (started in 1989), we have included both the

costs and the outputs in the quality enhancement programme. Major cleaning and renovation work on trunk mains is needed infrequently and when defined as a discrete project, we believe it is appropriate to include it in the quality programme. The rest of the work on cleaning is considered as part of companies' maintenance plans.

Final ministerial guidance also referred to additional advice given to the companies on security of the water supply network. We have included some additional work and associated costs in our final price limits.

We have allowed for 348 schemes to improve drinking water quality and meet other new obligations in our price limits.

Table 34 What the water quality programme will deliver in 2005-10

Drinking water quality and other new obligations (the policy codes are shown in brackets)	Number of sites	Capital expenditure 2005-10 (net of efficiency) (£m)	Additional operating expenditure by 2009-10 (£m/year)
<u>Water treatment</u>			
Nitrate reduction – to reduce high nitrate levels caused by diffuse pollution present in sources of water used for the drinking water supply (WA1)	75	288	6.0
Plumbosolvency control – conditioning of the water supply so it dissolves less lead from companies' and customers' pipework (WA2)	29	5	0.4
THM reduction – changes to company assets to reduce the level of by-products of disinfection to comply with water quality regulations (WA3)	6	24	1.0
Turbidity reduction – changes to companies' assets to meet the new tighter standard for clarity of drinking water leaving water treatment works (WA4)	21	26	1.0
Cryptosporidium risk reduction – required measures to companies' assets to reduce contamination from Cryptosporidium (WA5)	29	106	2.0
Pesticides treatment – to reduce pesticides levels present in sources of water used for the drinking water supply (WA6)	20	73	2.0
Other – other work supported by DWI at water treatment works (WA7)	59	167	5.0
<u>Water distribution</u>			
Relining activity – reline distribution mains to overcome quality problems as required by s19 undertakings (WA8)	6,436 km	806	0.0
Replacement activity – replace distribution mains to overcome quality problems as required by s19 undertakings (WA9)	6,988 km		
Lead communication pipe replacement – replace companies' pipework, where shown to be necessary to help meet lead standards at customers' taps (WA10)	47,820 (pipes)	24	0.0
<u>Other obligations</u>			
Schemes to improve acceptability of drinking water to consumers (WA11)	31	147	1.1
Other non-statutory improvements to drinking water quality (WA12)	1	<1	0.0
Miscellaneous work and work to improve security and provide emergency supplies of water (WA13, WA15)	82	342	4.0
Subtotal – new work identified for 2005-10		2,008	22.4
<u>Interaction with 2000-05 quality programme</u>			
Projects from 2000-05 completed in 2005-10 (WC1-WC15)	8	6	6.7
Additional projects identified as needed in 2000-05 completed in 2005-10 (WZ1,WZ2)			
Programme for drinking water and other obligations		2,014	29.1

Totals may not add due to rounding.

We excluded 19 projects as they were:

- not supported by the DWI;
- for cleaning, in part or in total, which is part of maintaining the distribution system, not an improvement (this work has been considered under companies’ maintenance programmes);
- proposals such as changes to the drinking water monitoring requirements that we consider are cost-neutral; or
- not adequately justified.

The projects included in our determinations will provide improvements to drinking water quality, meet other new obligations, provide additional security for companies’ assets and assist in providing emergency supplies of drinking water.

We have made some adjustments between the 2000-05 and 2005-10 programmes to take account of capital projects with assumed costs of £239 million that were not delivered as expected in 2000-05. Some of these changes are attributable to delays, and there are others where the quality improvements are no longer required or have changed; for example, the focus on work to reduce lead levels by plumbosolvency control, and not by lead pipe replacement. There have been changes to the activity on distribution mains renovation to fulfil s19 undertakings given by companies to the DWI. There is also an additional £87 million of capital expenditure included in price limits for new obligations required from companies in 2000-05 which will be incorporated into bills in 2005-10.

We believe companies can deliver the total drinking water programme for £2 billion capital expenditure and £29.1 million per year additional operating costs by 2009-10. The programme of asset improvements we have assumed is shown in table 35.

Table 35 Drinking water and new obligations – asset improvements assumed in 2005-10

Water service	Final determinations
Water treatment, pumping and storage	
Works to be improved (no.)	227
Water distribution	
Lead communication pipes to be replaced for quality enhancement purposes (no.)	47,820
Mains relined (km)	6,436
Mains replaced (km)	6,988
Mains cleaned (km)	8,874

13.3 Work to deal with the environmental impact of water abstraction

This is a complex area. It is difficult to assess the environmental impact of water abstraction, especially at remote sites and where there are many other variables such as other abstractors, land and drainage management, and the weather. Many of the 218 projects included by companies in their business plans required investigations. We reviewed all the proposals against our criteria.

Final ministerial guidance clarified the legal position of projects which are planned to provide replacement water when licensed abstraction is reduced to alleviate the environmental impact, for nature conservation reasons, or under the Habitats Directive. The impact of the reduction in the volumes permitted to be abstracted from sites will be dealt with through the compensation route specified in the Water Resources Act. This will ensure that all holders of abstraction licences are treated equally. We have therefore not included these projects in our final determinations. We have, however, provided for projects dealing with other aspects of nature conservation, such as fish passes and intake screens to protect fish.

We have only allowed the initial investigation element of some projects and not the costs of the companies' proposals for, as yet, unidentified but possibly more extensive investigations or solutions. We have included 167 investigations/options appraisals and 16 projects in our final price limits.

The remaining investigations and projects did not meet our criteria for inclusion in the quality improvement programme because:

- abstraction licence changes are not supported by final ministerial guidance for inclusion in price limits;
- companies had included projects that are not on the Environment Agency's list of outputs to deliver ministerial guidance;
- the outputs are not the responsibility of the water company;
- the company's proposals are not yet at a suitable level of specification;
- the company's proposals are based on very uncertain costs; or
- the outputs the company is expected to deliver are not adequately defined yet.

The work programme includes 167 investigations/options appraisals, and it is likely that some work on the solutions identified will need to begin before 2010. However, those projects involving replacement water sources will be dealt with through the Water Resources Act mechanisms.

The breakdown of the costs of this programme is given in table 36, and the associated work programme in table 37.

We have made some adjustments between the 2000-05 and 2005-10 programmes to take account of £22 million of capital expenditure assumed for projects that have not been delivered as expected in 2000-05. Some of these changes are attributable to delays, and for others the quality improvements are no longer required or have changed.

Table 36 Environmental obligations affecting the water service

Environmental obligations (the policy codes are shown in brackets)	No. of sites	Capital expenditure 2005-10 (£m)	Additional operating expenditure by 2009-10 (£m/year)
<u>New requirements for 2005-10</u>			
Habitats and Birds – reducing water abstraction affecting the most valuable nature conservation sites and threatened species in the European Union (Hw1-Hw3)	105	28	1.0
Countryside and Rights of Way Act 2000 – reducing water abstraction affecting Sites of Special Scientific Interest (SSSIs) (lw1-lw3)	35	4	0.1
UK Biodiversity Action Plan – reducing water abstraction to further the conservation of biodiversity (BAPw1)	25	7	<0.1
Water Framework Directive – work to prepare for implementation of the Directive (WFW1-3)	1	<0.1	0.0
Local Priority – not eligible elsewhere, changes to water abstraction of significant local importance (Lw1-Lw3)	19	5	1.0
Subtotal – new work identified for 2005-10		44	2.1
<u>Interaction with 2000-05 quality programme</u>			
Projects from 2000-05 completed in 2005-10 (WD10)	2	3	0.3
Environmental programme for the water service		47	2.4

Table 37 Water service – work to deliver the environmental programme

Water service	Final determinations outputs
Projects to investigate and alleviate environmental impact	
¹ Investigations – to investigate possible impact of water abstraction on the environment (no.)	159
¹ Option appraisals – to review the options to mitigate these impacts, including the environmental impacts of potential solutions (no.)	20
Implementation – projects to alleviate the adverse environmental impact of water abstraction (no.)	16
– the volume of replacement water for sustainability purposes these projects will deliver by 2009-10 (Ml/day)	9

¹ Some projects include both an investigation and an option appraisal.

13.4 The quality improvement programme for the sewerage service

For the sewerage service, the quality improvement programme falls into two parts.

- The programme to deliver the policy initiatives in Ministers' guidance for the English companies, and in the corresponding guidance from the Welsh Assembly Government for Wales. These policies have been translated into specific outputs by the Environment Agency with English Nature and the Countryside Council for Wales. They include new obligations placed on the companies since the price review in 1999. For example, the extension of sensitive areas under the Urban Waste Water Treatment Directive.
- Completion of the programme of work confirmed by Ministers in 1999, the majority of which is being delivered by companies in 2000-05.

For many projects the companies have adopted an integrated approach and proposed schemes which address more than one quality related policy area. In a significant number of cases there are also benefits to other areas such as maintenance, improved service to customers or dealing with supply/demand issues.

We have assessed all of the 3,635 projects included by the companies in their business plans, against our criteria. We have included 3,389 of these projects as quality improvements in our price limits, a further 25 have been dealt with under other cost categories.

We excluded some projects from our draft determinations because they did not meet our criteria. Since then, the Environment Agency, English Nature, the Countryside Council for Wales, the companies and other stakeholders have endeavoured to provide the information we needed to include these projects in our price limits. We have reconsidered all the parked projects.

The breakdown by policy driver and associated incremental costs for the sewerage quality improvement programme is shown in table 38. Many of the projects deliver more than one output and therefore the costs shown in the table for these do not represent the stand-alone costs for delivering a specific policy.

We made adjustments of around £590 million between the 2000-05 and 2005-10 programmes to take account of capital projects included at the price review in 1999 that were not delivered as expected in 2000-05. Some of these changes are attributable to delays, for others the quality improvements are no longer required; are uncertain; or have changed. For example, there is continuing uncertainty on the site for the Brighton and Hove sewage treatment works in Southern's area. We have also included £224 million additional capital expenditure in price limits for new obligations that were required from companies in 2000-05 which will be incorporated into bills in 2005-10.

We believe the companies can deliver this programme of 3,389 projects for £3.4 billion compared with the companies' estimate of £4.5 billion for 3,635 projects. A summary of the asset improvements we have assumed in our price limits resulting from this programme is shown in table 39.

We have excluded some projects in policy areas supported by Ministers because they do not meet our criteria. For example projects have been excluded if:

- there is a dispute between the company and the Environment Agency on the output;

- we consider that the company already complies with the requirement;
- the output is not the responsibility of the company;
- the company has not defined the output;
- the reporter has not validated the company's proposal; or
- the proposal is very expensive for the outputs delivered and we expect the company to review the solution they have proposed.

For some projects, we have included only the costs of the investigation stage of the project in price limits rather than the costs of both the investigation and solution. Any solution will be considered once the investigation is complete.

In some cases the Environment Agency has agreed that it is not yet possible to identify a suitable solution and we have included the costs of an investigation in price limits, eg to investigate the impact on water quality of discharges from Knostrop sewage treatment works to the River Aire in Yorkshire. In other cases where we are not satisfied that the companies have examined all the possible solutions we have only included the cost of an investigation or options appraisal. For example, at Davyhulme in Manchester the Environment Agency has requested that United Utilities reduces the number and impact of storm sewage overflows into the Manchester Ship Canal, which are detrimental to the fish population. We believe the company's original proposal, a major civil engineering project to construct large storm tanks, is expensive and offers poor value for customers as well as the environment, at over £100 million, compared with the benefits that might accrue. We would like the company to carry out further investigations on the impact on the fish population and explore other ways of delivering the improvements before embarking on a project that has a significant impact on customers' bills.

The Environment Agency has identified 19 projects included in its original March 2004 list of improvements and also in our draft determinations, where investigations have shown that improvements are not needed to deliver the specified policy drivers.

Since our draft determinations, and in response to stakeholder representations, we have reviewed our approach to dealing with proposals to connect existing properties to the public sewerage system under Section 101A of the Water Industry Act 1991. We have analysed companies' cost estimates, and included what we consider to be an appropriate amount for them to fulfil their obligations. The costs of providing a sewerage service to such properties is borne by the existing customers, and we want to ensure that companies are carrying out their duties in an efficient way. Also, companies are only required to accept this duty if it is the most economic option to deal with an existing environmental or amenity problem. If not, householders are responsible for managing their own drainage arrangements. Where companies have included very expensive proposals (which we have judged as costing more than £41,000 per property) to provide a public sewerage system, we believe companies should review the proposals. We believe that the s101A duty for these high cost projects can be resolved in three ways:

- connection to the public sewerage system – if necessary using innovative technology – eg small bore or vacuum sewerage;
- provision of local treatment facilities, including septic tanks or cesspools serving more than one property – these would be built, operated and maintained by the sewerage undertaker; or
- demonstrating that the undertaker does not have a duty to connect.

Table 38 What the environment quality programme will deliver in 2005-10

Environmental and other new obligations (the policy codes are shown in brackets)	Number of sites	Capital expenditure 2005-10 (£m)	Additional operating expenditure by 2009-10 (£m/year)
Compliance with EU directives			
Urban Waste Water Treatment – upgrades to sewage treatment works to produce cleaner discharges to the environment (U1, U1a, U2, U3, U5)	254	412	18.7
Groundwater – investigations and improvements to treated effluents and intermittent discharges which may affect groundwater (G1-G4)	254	38	0.2
Freshwater Fish – reduction in levels of pollutants, principally ammonia in discharges from sewage treatment works to allow more favourable habitats for fish (F1a-F1b, F3)	127	584	11.6
Bathing Waters – improving sewage treatment works and overflows to assist compliance with European microbiological standards (B1, B2, B4, B6)	99	23	0.1
Shellfish – reduction of microbiological pollution to ensure a suitable environment for shellfish growth (S2, S3)	25	2	0.1
Dangerous Substances – reduction in levels of List I and List II substances in sewage effluents to achieve Environmental Quality Standards (D1, D1a)	4	12	0.1
Habitats and Birds – investigations and improvement in quality of discharges to safeguard the most valuable nature conservation sites and threatened species in the European Union (H1-H8)	241	312	8.2
Integrated Pollution Prevention and Control – changes to assets or operations to comply with new European requirements to limit pollution (IPPC)	14	13	1.1
National legislation			
Countryside and Rights of Way Act 2000 – investigations and improvements to the quality of water affecting sites of special scientific interest (SSSIs) (I0-I6)	123	125	3.4
First-time sewerage – connection of existing properties to the public sewerage system (A14)	171	188	1.1
National policy initiatives			
Chemicals – investigations into the effectiveness of endocrine disrupter removal technologies (C1, C2)	21	26	2.9
UK Biodiversity Action Plan – water quality improvements to meet targets under the UK Biodiversity Action Plan (BAP1- BAP3)	8	11	0.7
Local Priority – improvement schemes that are of significant local importance (L1)	11	30	1.0
Unsatisfactory intermittent discharges – emergency and storm overflows from combined sewers and storm tanks to limit pollution (UID0, UID1)	1,657	558	3.7
Enhanced sewage sludge management – schemes to ensure disposal of sewage sludge in an environmentally sustainable way (SL1 a, b, c)	21	209	8.1
Sustain planned level of environmental protection – improvements needed to ensure continued achievement of obligations largely established at the last price review in 1999 (A4-A13, A15-A19)	38	73	0.7
Miscellaneous (A20, A21, other (Co), SDB early start)	3	15	0.7
Other unsupported cost drivers (various)	46	0.1	0.1
Subtotal – new work identified for 2005-10	3,117	2,631	62.5
Interaction with 2000-05 quality programme			
Completion of work from 2000-05 delayed to 2005-10 (SG1-13, SH3-44)	49	170	
Completion of work identified in 1999 but planned for completion in 2005-10 (SG1-13, SH3-44)	870	225	
Logging up and new 2000-05 projects in 2005-10 (SZ1-11, various)	36	424	
Subtotal – for interaction with 2000-05 quality programme	955	819	40.4
Quality programme for the sewerage service	4,072	3,450	102.9

Table 39 Sewerage service – summary of asset improvements and other work

Sewerage service	Final determination outputs
<u>Sewerage system</u>	
Number of unsatisfactory intermittent discharges improved	2,005
Improvement of the sewerage network for environmental reasons:	
– length of new sewers	364 km
– length of sewers increased in size/capacity	7 km
<u>Sewage treatment</u>	
Improvements to sewage treatment works or new works	1,043 No. (serving 21.5m p.e.)
<u>Sludge</u>	
Quantity of sewage sludge companies estimate they will produce per year by 2009-10	1,593 ttds
Additional annual sewage sludge production by 2009-10 arising from quality improvements	94 ttds
<u>Investigations</u>	
Number of investigations to assess impact of sewerage service assets and activities on the environment	379

p.e. – population equivalent served by sewage treatment works
ttds – thousands of tonnes dry solids of sewage sludge

13.5 Regulatory impact assessment (RIA) for England

For England, the Secretary of State’s principal guidance asked for work in five policy areas to be subject to a regulatory impact assessment, before she made decisions on work in her final ministerial guidance. The five policy areas were:

- the UK Biodiversity Action Plan;
- a research project on endocrine disrupters;
- land management schemes;
- local priority schemes; and
- for the water service – consumer acceptability of drinking water.

This work is not required under national or European legislation. Defra officials were asked to carry out a RIA on these policy areas. Final ministerial guidance confirmed that specified projects in these policy areas should go ahead.

Companies included costs for 163 projects in the final business plans, but only 120 meet the criteria for consideration in the RIA.

Having received ministerial support, we reviewed each of these projects against our remaining criteria. We included projects in price limits, where they had defined activity, outputs and due dates.

Most of the proposed projects met these criteria. Where they did not, we discussed them with the companies and the quality regulators.

For example, in our draft determinations most of a land management programme put forward by United Utilities did not meet our criteria. There were no clear outputs for these projects. Since our draft determinations we have received more information on these schemes, particularly from the RSPB. We have included in price limits all the work required for the southern area (which includes Dark Peak), and the Bowland Fells area. We believe the additional operating costs associated with the other areas proposed for this research were high, and the estimates were not sufficiently well founded to include in price limits. The work we have included will allow the impact of all the measures on these two areas to be fully monitored and assessed. This will ascertain whether changes in land management do lead to improvements in the condition of upland SSSIs and also the quality of water in downstream watercourses.

The southern area contains the largest area of SSSI land in unfavourable condition, and the Bowland Fells area contains a small area of land in unfavourable condition within a large area of important nature conservation sites. This may help inform the drafting of the programme of measures arising from River Basin Management Plans required under the Water Framework Directive in 2009. The Government strongly supports this work, and therefore we have assumed, when judging what to include in price limits, that the Government will also provide agri-environment grants. This will allow the costs of the work to be shared. It is true investigative work, and it is not possible to specify outputs.

Projects not included are:

- Dambridge – A project in Southern’s area to modify the sewage treatment works to lower phosphorus levels in the River Wingham (and contribute to the Biodiversity Action Plan). The costs of the solution proposed by the company significantly outweigh the benefits. Any reduction in abstractions arising from the investigation on low flow may change the balance of the costs and benefits of this proposed project. The Environment Agency is intending to review this scheme when the outcome of the investigation on low flows is complete, and expects the company to review the costs for the proposal. At that point, Defra ministers will be able to decide if the scheme is still required on both technical and cost benefit grounds.
- Etton borehole – This scheme was supported by ministerial guidance, and planned to pump groundwater from Etton borehole (in Anglian’s area) to deal with pollution of the aquifer supplying this borehole by a waste disposal site. We believe that in this instance it is inappropriate for water customers to be expected to pay to mitigate the pollution of an aquifer by a third party. The Environment Agency has responsibility for groundwater protection, and it would be inappropriate to impose the costs on Anglian’s customers.
- Coniston – An RIA scheme to reduce phosphorus levels in Coniston Water (in United Utilities’ area) and contribute to the Biodiversity Action Plan. We have included an investigation, not the full scheme, which is dependent on the outcome of the investigation.

Final price limits include the programme of research to investigate whether sewage effluents can contribute to changes in fish physiology, resulting in disruption of their endocrine systems. We have previously stated that we believe this research should be financed by the Government rather than water companies. In their final guidance, Ministers wanted this work to be included in price limits and paid for by customers. We think that it is essential that complementary work is also carried out by other parties, including where appropriate, the Government, to ascertain the source of any substances entering the sewerage system and to

determine how chemical products, for example, can be formulated to reduce their impact. It is not sustainable for action to be restricted to 'end-of-pipe' energy intensive technology which requires further reductions of concentrations of any active compounds in sewage effluents. As customers are paying for this work, we shall expect that if any new technology developed by the companies leads to export opportunities, the financial benefits should be shared between the customers of the water companies and shareholders.

We have included 109 of the projects in the RIA in the quality programme, in full or in part, in our price limits at a capital cost of £198 million (after efficiencies) and a further 7 projects for dealing with consumer acceptability have been considered as part of the companies' programme of work for maintaining the water distribution system. These are included in the relevant totals and tables in sections 13.4 and 13.5.

13.6 Other service performance improvements

We have scrutinised each of the schemes where companies proposed service improvements. We have looked for clearly defined improvements to service performance levels where customers will see benefits. We have looked at the results from the joint stakeholder market research and any additional research provided to us by the companies to confirm that customers want and are prepared to pay for the proposed improvements. Comments about the schemes, from WaterVoice and other stakeholders, based on their local knowledge, have also been taken into consideration. Finally, we considered the cost effectiveness of the proposed schemes.

In their responses to our draft determinations, many companies and customer representatives expressed concern that too little had been allowed for sewer flooding, which was seen as a key customer priority. In the light of these concerns we have reconsidered our approach to sewer flooding as explained below. However, we still consider that every element of the companies' plans should be scrutinised to ensure that the benefits justify the costs.

At an industry level, our price limits include a total of £0.6 billion for such improvements. Schemes to reduce the number of known sewer flooding problems account for most of this expenditure and our assessment of these schemes is described in detail below.

Sewer flooding

In their business plans, companies proposed making significant progress in dealing with properties known to be at risk of flooding internally at least once in every ten years, due to inadequate capacity in the sewerage system. They also proposed tackling the worst cases of external flooding from sewers. Several companies also proposed reducing the numbers of properties flooding because of blocked sewers and to reduce the impact of flooding where it does occur.

Our assessment has significantly reduced the overall costs of the sewer flooding programme proposed by the companies while preserving the great majority of the benefits for customers. Our final determinations allow companies to provide a capital scheme or measures to reduce the risk or impact of sewer flooding for every known problem identified in companies' plans where overloaded sewers cause repeated internal flooding and where the companies proposed taking action by 2010. In total (after efficiency) we have allowed £970 million (of which £600 million is included as service enhancements and £370 million is included in the capital maintenance and supply and demand programmes) to address the problem of sewer flooding.

This would resolve 9,210 or about 90% of the internal flooding problems proposed in companies' business plans and 6,030 or 80% of external ones. It would do so at around 75% of the cost proposed by the water companies. This reduction in costs reflects the challenge we made to a number of very high cost schemes put forward by the companies. We have also adjusted the forecast numbers and costs of dealing with newly emerging problems.

Our assumptions would deal with 5,360 current problems of internal hydraulic flooding at least once in ten years and 3,850 which are forecast to emerge. Taking account of adjustments we have made to the forecast number of new problems in two companies and that not all emerging problems can be dealt with by 2010, we expect to see around 3,100 properties at risk of internal hydraulic flooding at least once in ten years in 2009-10 (about 0.01% of all properties), compared with about 8,800 in 2004-05. We have also assumed that mitigation measures would be taken to protect a further 4,660 properties from the effects of flooding and that around 3,700 properties would be protected from flooding due to blockages in Thames' area.

Companies' plans varied but included work to deal with new sewer flooding problems which might emerge during the five years to 2010, as well as making significant progress in dealing with problems already identified. New problems will arise for a number of reasons, either because new demands are placed on the sewerage network or because changing rainfall patterns test parts of the system which were previously thought to be adequate. We have assumed that any work needed to deal with emerging problems will be dealt with either through the companies' work to maintain current service levels or through their plans to deal with the impact of growth and new development. We treat dealing with properties already known to flood as a service improvement. We assume that companies will improve efficiency at the same rate as for environmental and supply/demand improvements.

We have assessed companies' projections for the number of new problems expected to emerge. Where these look unrealistic or significantly out of line with the rest of the industry we have challenged the projections. As in our draft determinations we have adjusted costs for some companies, where necessary, to a limit of 125% of the average costs of dealing with those problems that cost less than £120,000 each. This takes account of the possibility of costs increasing in the future.

We accept that sewer flooding is one of the worst service failures that a customer can experience and that rapid progress needs to be made to reduce the impact on customers. However, altering sewerage systems to solve sewer flooding problems can be expensive and we are conscious of the need to ensure that the work proposed offers sufficient benefits to justify the costs. We have therefore commissioned several pieces of work to examine this issue including 'Assessing the benefits of reducing the risk of flooding from sewers' by Colin Green and Theresa Wilson, FHRC (August 2004); 'Survey of customers affected by sewer flooding', Research by Design (August 2004), and have reviewed other evidence where available. We have also taken note of the report on cost-benefit analysis undertaken by Professor David Pearce for the NAO in their report 'Out of sight not out of mind'. This analysis has informed our judgements about the appropriate scale of improvements in the period up to 2010.

We have looked at the companies' proposals for tackling known problems and taken a view on what is most likely to constitute a cost-beneficial programme. Quantifying the benefits of resolving sewer flooding is not clear-cut. However, in our draft determinations, taking account of the evidence available and stakeholders' desire to make progress, we judged that sewer flooding schemes were less likely to be cost-beneficial where the costs exceed £120,000 per property protected. We used this judgement to inform our view about the overall scale of a programme likely to offer reasonable value for money, given what we know about the likely costs of dealing with known problems. We proposed that schemes costing more than this per

property should be subject to further cost-benefit analysis and if found to be worthwhile such schemes would be recognised in subsequent price reviews.

In their responses to our draft determinations, many companies and customer representatives expressed concern that too little had been allowed for sewer flooding. There was also widespread concern that the application of a £120,000 threshold for properties would undermine companies' prioritisation methods and could mean that more expensive but worthwhile schemes would be delayed or not undertaken. Little weight was attached by respondents to our proposal that such expensive schemes might subsequently be logged up after further investigation and cost-benefit analysis. The final guidance from the Secretary of State and the Welsh Assembly Government and reports from various parliamentary select committees also emphasised the importance of making early progress on sewer flooding.

In light of the strength and consistency of views on this issue we have reconsidered our approach. Rather than relying on the logging-up mechanism to fund schemes costing more than £120,000 per problem solved we have decided to include more in price limits at this stage. We have assumed that all expenditure on schemes costing below £120,000 per problem is likely to be cost beneficial, that 70% of expenditure on schemes costing between £120,000 and £250,000 per problem and 40% of expenditure on schemes costing more than £250,000 is likely to be cost beneficial. It is for the companies to take the detailed decisions about individual schemes. We have used these assumptions to decide how much customers should be asked to fund on sewer flooding at this stage and to forecast the numbers of problems which we expect companies to resolve.

There will still be some flooding problems which will not receive a capital solution before 2010. To recognise the position of these customers, we have made allowances for mitigation measures for existing problems where funding for capital schemes is not included in price limits. This is in addition to the mitigation proposals already put forward by four companies and included in our draft determinations. Our final determinations assume that a total of 4,660 properties would receive such protection. This is consistent with the approach set out by the Association of British Insurers in its recent work on flood-resilient homes with the National Flood Forum. This showed that not only can such measures reduce the incidence and extent of flood damage, but they can also reduce the subsequent restoration costs. Price limits therefore now allow for either a capital scheme or measures to reduce the risk or impact of flooding for every currently known high-risk problem due to overloaded sewers which the companies proposed tackling by 2010.

Some companies also proposed reducing the number of flooding incidents due to repeated blockages. Where we are satisfied that there will be a sustained auditable output or improvement in service we have accepted their proposals. Our determinations would allow over 3,700 problems of this sort to be addressed by Thames.

Table 40 summarises the assumptions that we have made in these price limits. It shows the number of hydraulic problems for which a capital scheme has been assumed. The costs shown include allowance for mitigation and flooding due to blocked sewers.

Table 40 Assessment of proposals to reduce risk of flooding from sewers for 2005-10

Company	Company proposal				Final determinations			
	Internal flooding ¹	External flooding	Properties at risk of flooding 2009-10	Total forecast cost £m ²	Internal flooding ¹	External flooding	Properties at risk of flooding 2009-10	Total likely cost £m ²
Anglian	640	1,010	280	90	620	980	300	80
Dŵr Cymru ³	740	430	20	70	720	430	40	60
Northumbrian	430	90	30	50	390	90	80	40
Severn Trent	1,500	1,070	860	250	990 ⁴	620	780	150
South West	260	260	130	30	240	250	140	30
Southern	440	540	200	160	400	400	240	100
Thames	4,350	2,940	3,110	520	3,520 ⁴	2,040	1,020	410
United Utilities ⁵	960	460	100	160	1,110	380	120	110
Wessex	850	790	110	90	830	750	130	70
Yorkshire	400	100	220	50	390	90	230	40
Industry total⁶	10,560	7,690	5,120	1,470	9,210	6,030	3,080	1,080
Total cost after efficiency improvements								970

- 1 This includes work to tackle existing and forecasts of newly emerging problems.
- 2 Cost before efficiency adjustments.
- 3 Includes properties on the DG5 register based on revised data.
- 4 Adjustments made to forecast numbers of newly emerging problems.
- 5 Final determination includes 163 projects carried forward from AMP3.
- 6 Numbers may not add due to rounding.

It is clearly for companies to manage their sewer flooding programmes and we accept that a degree of flexibility is necessary, particularly where new information suggests that particular schemes may be more or less cost-beneficial than previously thought. We expect the companies to keep under review the balance of costs and benefits for all the schemes they propose carrying out. Where they decide that schemes should not progress because they are not cost-beneficial, and cannot find suitable alternative priority projects, we will adjust their programmes to take account of this at the next price review.

We will ask reporters to assess the quality and outcomes of companies' approaches to cost-benefit analysis each year and report their findings to us. We will expect that schemes to deal solely with problems emerging after March 2007 should be subject to rigorous cost-benefit tests. We will work with the industry to develop a database and methodology which can be used to inform decisions during the coming years and for the next price review in 2009. However, we also do not want companies to simply deal with those problems that have the cheapest solutions, as has been the case in the past. We have therefore encouraged every company to develop a prioritisation system so that account is taken of the impact on affected customers. We expect companies to prioritise their investment programmes accordingly, review progress against the prioritised list regularly with WaterVoice, and report to us each year.

We are also actively considering the arrangements for compensating customers for the damage and distress they experience when flooding does occur. The recent Marcic judgement in the House of Lords acknowledged that it was appropriate for us to make a judgement about the costs which it was reasonable for customers generally to pay to address sewer flooding. But the Lords also noted that those customers who were subject to continued flooding should be compensated for the detriment they bore.

We are therefore working with the water industry, the insurers and with customer groups to review existing provisions for insurance and compensation to decide whether they are adequate and, if necessary, how they might be improved. We held a workshop in March this year and have commissioned the survey of flooded customers referred to earlier. This should

establish the costs they incur and the extent to which the damage incurred is currently covered by insurance claims or by the sewerage companies. We will also be reviewing companies' policies and practice on the payment of compensation. The results of these various pieces of work will be discussed again with the industry later this year to establish what, if any, changes to existing arrangements may be appropriate. We expect to consult on a possible way forward in the first half of 2005, but would expect this to have only a small financial impact on companies.

Other service improvements

There were other service improvements included by companies in their business plans. We have allowed for the following in our price limits:

- Dealing with low flow and water pressure at over 19,000 properties supplied by Severn Trent, Southern, Bristol and Cambridge.
- Improving the taste and odour of the drinking water supplied to all 190,000 properties supplied by Bournemouth & West Hampshire, and those supplied from three of Severn Trent's treatment plants.
- Reducing the hardness of drinking water supplied to about 21,000 customers supplied by Severn Trent.

This is in addition to the work the companies will undertake as part of maintaining their assets and improving drinking water quality and the environment.