Minutes of Evidence

TAKEN BEFORE THE SCIENCE AND TECHNOLOGY COMMITTEE
(SUB-COMMITTEE I)

WEDNESDAY 2 NOVEMBER 2005

Present

Broers, L
Howie of Troon, L
Lewis of Newnham, L
Mitchell, L
Oxburgh, L
Patel, L

Perry of Southwark, B
Platt of Writtle, B
Selborne, E (Chairman)
Sharp of Guildford, B
Taverne, L
Whitty, L

Memorandum submitted by Ofwat

SUMMARY

Who we are

The Office of Water Services (Ofwat) is the economic regulator of the water and sewerage industry in England and Wales. Until 1 April 2006 these functions rest formally with the Director General of Water Services, Philip Fletcher. From 1 April 2006 they transfer to the Water Services Regulation Authority (WSRA). Our duties are laid down in law and, where necessary, we make judgements about how best to balance these duties.

Although our decisions are made independently of Ministers, on water resource issues we work closely with Defra, the Welsh Assembly Government and the Environment Agency.

What we do

Our main task is to set price limits for the companies and monitor their performance against them. The price limits restrict the increases in charges that companies can make to their customers each year. The current price limits were set in 2004 for the period covering 2005–10.

Within our price limits in 2004 we assumed companies, provided that they are efficient, will spend £16.8 billion on capital projects over the next five years. Of this we assumed companies will need to invest £2.3 billion (net of capital contributions from developers) to ensure that the supply of water meets essential demands and that companies’ sewerage systems can deal with the increased volume of sewage.

We believe this will allow the companies to:

— meet all changes in demand for water both from new and existing customers;
— promote the efficient use of water by customers;
— install and operate optional meters; and
— ensure that leakage is kept at the economic level.

For any company where the current security of supply position is not adequate we have assumed that it will make the required improvements either by reducing its leakage to the economic level, by enhancing demand management, or commissioning new sources to the timetables set out with our decisions.

Our evidence to the sub-committee can be summarised as follows:

— The lack of rain last winter and the dry spring that followed has resulted in the present water shortage in the South East of England. The drought requires careful management by the companies operating in that area and others to protect customers and the environment.
— We believe that the assumptions we have made in price limits for 2005–10 will allow companies to continue to provide a good level of service to their customers.
— Investment in the water supply and drainage infrastructure has increased substantially since privatisation. In the next five years companies will invest around £8.4 billion to maintain these assets.
Both the water industry and its regulators need to take account of uncertainties, such as climate change, when looking to the long term. The framework of regulatory and asset planning systems will allow the companies to identify and address the impact of these as they become evident.

Nationally water companies forecast that the demand for water will remain broadly stable until 2020, and will then increase. There is a more variable regional picture and companies will need to invest in assets to meet changing patterns of demand. Demand management activities are likely to grow in prominence as technology advances and resources in certain areas such as the South East become more constrained. We believe that science, engineering and technology will make a contribution to optimising water use.

Extension of metering for household customers should help to underpin future advances in demand management, particularly when targeted at resource constrained areas, and will send price signals to customers.

DEFINING THE PROBLEM

What are the main causes of the current problems of water supply, and how serious are they?

1. The lack of rain last winter and the dry spring that followed has resulted in the present water shortage in the South East. Dry weather aggravated the problem as it leads to increased demand. Despite recent rainfall, the Thames basin only received around two thirds of average rainfall in July. August rainfall for the South East has been about average.

2. The current drought is only affecting a few areas (namely the Thames Basin, Sussex and Kent). It is not unprecedented but we expect the South East companies to manage the position carefully using the drought plans that are currently in action. So far, five companies have hosepipe and/or sprinkler bans in their areas (Southern Water, South East Water, Mid Kent Water, Sutton & East Surrey Water and Chalderton & District Water). Hosepipe bans are a precautionary measure to limit discretionary water use, helping to maintain sufficient stocks of treated water for essential use such as public health and sanitation.

What are the projections for future water supply, and what factors will influence these projections? Where, and over what timeframes may problems emerge?

3. The water and sewerage companies in England and Wales each have a duty to maintain and develop an efficient and economical system of water supply in their operational areas. Each company agrees with the Environment Agency (EA) a 25-year water resources plan showing how it will maintain an adequate balance between supply and demand. In formulating their plans, companies make forecasts of future demand. Companies use these forecasts to identify the need for future investment in water supply resources.

The baseline demand for water is complex and driven by wider social and economic forces, but the main influences are:

- population, affluence and occupancy rates of households;
- numbers and types of business;
- consumption per head of population (this is increasing as household size decreases);
- proportion of metered properties (they tend to use less water); and
- weather conditions (drier weather leads to increased water use).

4. Within long-term water resources planning it is not possible or sensible to eliminate all risk of supply interruptions during extreme events such as droughts, but we do expect companies to reduce this risk to an acceptable level. At the 2004 price review, a number of companies forecast the need to invest further in order to improve the security of supply that their assets currently provide. This is because companies believe that customers are currently exposed to a higher than planned risk of supply interruptions in dry years. We therefore assumed in price limits that around £3.1 billion of investment (or £2.3 billion net of capital contributions from developers) will be needed over the next five years to enable companies to maintain the balance between supply and demand for water and sewerage services. Much of this investment is to meet changing patterns of demand, rather than overall growth in demand. Improvements in security of supply assumed in price limits include:

- water treatment enhancements, water transfers and demand management interventions by Southern Water in Sussex and the Isle of Wight;
— network improvements, groundwater resources, metering and leakage reduction to deliver significant improvements to security of supply for customers of Folkestone & Dover Water; and
— a substantial improvement in the security of supply for London, to be delivered by Thames Water through a combination of replacement of water mains, enhancements of supply, and leakage reduction.

5. Water resources pressures are greatest in the South East region. In price limits for water companies in England and Wales 2005-10 we have allowed for a number of companies’ proposals to fund investigations into either extending existing reservoirs or developing new ones. A high level of demand, population changes (particularly growth in and around London) as well as the effects of climate change will mean that resources in the South East are likely to be constrained in the future. We therefore continue to support companies in pursuing a twin track approach of managing demand but developing sustainable resources where necessary.

Is sufficient research being devoted to predicting, and handling, possible future scenarios?

6. Companies and the EA are currently undertaking research into climate change and we expect this will be taken into consideration in companies’ long-term decisions on the content of future water resources plans. We await the next update of the UKCIP (UK Climates Impact Programme) scenarios planned for 2008. We are also contributing to developing a quadripartite study with UKWIR (UK Water Industry Research), the EA and Defra to look at the economics of demand-side options and work towards a framework in which they can be further developed. Gaining greater certainty in these areas is a priority for the next few years so that appropriate integrated strategies can be incorporated into future price reviews.

Is the response of Government, the EU, regulators and the industry adequate?

7. Since the drought in the mid 1990’s the industry has made great progress—including reducing leakage by about one third. This has enabled it to respond well to the current dry spell. Leakage is at economic levels for all companies except Thames Water and United Utilities. We are monitoring the progress of these companies against action plans for recovery. We expect total leakage to fall by an additional 8 per cent (315Ml/d) by 2010. We have set price limits that allow companies in the South East to address certain identified problems relating to increasing water supply and managing demand. Companies are making other improvements to solve problems as they arise.

The Government, EA and Ofwat are working with the industry to assure the issues are fully understood and dealt with effectively. If however we have another very dry winter then we could well be facing further restrictions next summer.

Supply and Demand

8. The water companies have a duty to secure water supplies for their customers and meet new/existing demand for water as efficiently as possible. We expect all companies to achieve a security of supply index\(^1\) score of 100 by 2010. We support a twin-track approach (employing both demand side and supply side measures) to manage water resources effectively both now and in the future. It is for companies to decide how best to meet their obligations. Companies choose schemes from the four categories below to form a long-term optimal cost plan:
— Customer side—eg water efficiency campaign, metering programme, customer supply pipe leakage reduction;
— Distribution side—eg leakage reduction, network pressure management;
— Production side—eg water transfers, process improvements; and
— Resource management—eg extending or developing new reservoirs, extending or developing boreholes, new bulk supplies from other companies.

What are the likely future trends in water demand, and what can be done to manage demand more effectively and to influence the behaviour of consumers and others?

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\(^1\) The security of supply index allows us to assess each company’s compliance with its statutory duty to secure water supplies. This index enables us to assess water resource availability and leakage issues within a wider security of supply context. An index of 100 means that a company has no deficit against target headroom in any water resource zone.
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FUTURE TRENDS IN DEMAND

What are the options for increasing water supply, and what are the arguments for and against?

9. At the national level water companies forecast that the demand for water will remain broadly stable until 2020, and will then increase. There is a more variable regional picture, with significant increases in demand projected for some companies in the South East of England. In the medium term, by 2009-10 we expect a 1.6 per cent increase in demand for water delivered to households and a 5.7 per cent reduction for non-households. In the long-term we expect these trends to continue as the number of households increases and heavy industry demand continues to decline. In setting our 2004 price limits we took account of demand trends at the water resource zone level. Much of the investment programme included in our price limits reflects the need to invest in assets to meet changing patterns of demand, rather than growth in demand overall.

What can be done to manage demand effectively?

10. The current regulatory framework, strengthened by the Water Act 2003 and the Water Framework Directive, provides a wide range of powerful and flexible regulatory tools. Over time we expect that demand management measures will gain in prominence but some demand management initiatives, particularly metering, are already having an effect.

11. We support the Government initiatives to increase consumer information and awareness, including the proposed voluntary product labelling scheme, and offering Enhanced Capital Allowances (ECA) for using water-efficiency technology in new properties. We anticipate that the proposed changes to the Building Regulations and the production of a Sustainable Buildings Code will allow for investment in water efficiency where it is most economically viable.

12. In addition, there are new duties introduced by the Water Act 2003, to consider water efficiency. Water companies have a statutory duty to promote the efficient use of water by their customers. Activities include:

— advice on the sensible use of water in the home and garden;
— informing customers of how to conduct water audits of their own consumption;
— raising awareness of the availability of cistern devices and other water saving devices;
— promoting free supply pipe leak detection and repair, and a leak-line number; and
— highlighting where customers can get further information.

Of these the most significant savings are made through supply pipe repairs. Many companies offer free repairs or subsidised replacements although supply pipes remain the responsibility of property owners.

13. We believe that further demand management interventions by water companies will be implemented when it is clear they are economic, as long-term plans develop and are updated. Ofwat and other stakeholders are giving further consideration to positive incentives to increase demand management activity. However, any effective strategy will require contributions from many key players. We believe this strategy should include the following elements:

— Cost-effective metering. There is scope for metering within existing legislation (water scarce area status, metering on change of occupancy, and metering users of water intensive facilities (eg swimming pools)).
— Strengthen the research database. We suggest an initiative to co-ordinate the building up of a database of costs and savings of demand management options. The water industry has already started to collate this information as part of its UKWIR Sustainability of water efficiency measures project and could form the basis of a database.
— Develop a recognised and accredited water efficiency labelling scheme. This could help inform customers about water efficient appliances.

What contribution can science, engineering and technology make towards reducing water use or waste by households, businesses and the public sector?

14. We believe that where there are pressures on resources, demand management is likely to increase in prominence as demand side options become more competitive, and as technology advances. However we believe the main area where technology can contribute is in the use of water efficient goods. For example, metering gives customers a financial incentive to reduce consumption. We believe that achieving higher rates
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of meter penetration amongst household customers, particularly those in resource constrained areas, underpins further development of demand management activity. Metering will also increase the incentive to develop water-efficient technology commercially.

INFRASTRUCTURE

What is the current state of the water supply and drainage infrastructure? Is there sufficient investment in its improvement?

15. We monitor the performance of the industry’s assets (replacement value of over £200 billion). This year we reported that the performance of water service assets and sewers broadly met our expectations. The exception was sewage treatment assets, where performance against the much higher standards now required was a cause for concern for some companies. We expect improvements, and have required the companies concerned to put in place action plans to improve performance. We expect all companies to deliver stable serviceability from their assets.

16. In setting price limits for 2005–10 we have made an average annual provision for companies to invest £1.7 billion to maintain their assets. This represents an increase of around 22 per cent compared with the assumptions made in the previous price review in 1999, and compares with an annual figure of just £0.6 billion (in comparable prices) spent less efficiently on maintenance in the early 1980s. We believe that the price limits we have set will enable companies to maintain their assets effectively, meet demand from customers and deliver the stepped improvements required in drinking water quality and environmental performance.

CONTEXT

The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at national and European levels, adequate?

17. The Water Act 2003 introduced a new duty for Ofwat to contribute to the achievement of sustainable development. We are currently working through what this will mean to our future approach to regulation. We believe that the current regulatory framework provides a powerful set of tools to ensure appropriate long-term planning.

18. Looking more broadly at the issue of water sustainability, we believe there are important issues in considering the role of the water industry and the contribution of other sectors. More attention, for example, is needed on how to address diffuse pollution rather than always looking to the water industry for engineering based solutions to water quality concerns. Delivering a balanced set of measures to meet the requirements of the Water Framework Directive may require new policies to tackle problems at source. We also continue to emphasise the need for sound cost benefit analysis to inform wider policy-making on the water environment.

How does water figure in the development of Government policy in areas such as housing, land use planning and industry?

19. We support the need for an integrated approach. For example, we assessed companies’ plans against ODPM housing projections at the price review and used this to challenge the companies’ plans. We have also been involved at a local level in several of the areas where substantial development is planned by 2016, including Ashford, Milton Keynes/South Midlands, Thames Gateway and London/Stansted/Cambridge.

What can the UK learn from the experience of other countries?

20. As the economic regulator for England and Wales we have sought to improve the scope of our international comparisons and publish an annual report on these issues. Comparable data is hard to find. Broadly, where we are able to make comparisons the companies, whilst keeping bills in line with other countries, match or better their counterparts in developed countries in a variety of areas including unit costs, drinking and bathing water quality, leakage and customer service. Our international work has provided insights into how the supply demand balance can be best managed.
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Water resources

21. The current dry spell is by no means limited to the UK. Several other European countries are in the grip of severe droughts. In order to try and combat the inequality of resources between the north and the south of the country, the Spanish Government recently started a £2.9 billion program that includes building 15 desalination plants. The Spanish Government’s decision reflects the steadily falling cost of water supplied from desalination plants as the technology has improved and the environmental concerns over the Ebro River transfer scheme. This is one of the reasons that we support in principle Thames Water’s plans to build a desalination plant in Beckton, East London and have allowed for the resources arising in our price review.

Demand management

22. Looking further afield there is evidence that suppliers and consumers can reduce the demand for water. For example in Australia:

— Sydney Water has managed from a high base to reduce per capita consumption by 20 per cent, compared to 1991 levels, through a combination of usage restrictions; retrofit programs and business targeted schemes.

— The Australian Government has passed legislation to introduce mandatory water efficiency labelling for appliances like washing machines and dishwashers. Defra is currently looking into starting a voluntary version of the scheme in the UK and we support this initiative.

Infrastructure

23. In terms of the state of the infrastructure, our international comparisons show that the companies in England and Wales perform at least as well as their peers in other countries. This is because we enable the companies to have sufficient revenue to maintain and improve their networks. In contrast estimates suggest that the regulatory regime in the USA has resulted in the infrastructure requiring £220 billion of investment over the next 20 years and £41–45 billion needs to be spent on the German sewerage network.

October 2005

Examination of Witnesses

Witnesses: Mr Philip Fletcher, Director General and Mr Kevin Ridout, Principal Engineer, Quality Enhancement Team, Ofwat, examined.

Q1 Chairman: Welcome, Mr Fletcher. Thank you for the help you have already given us at our seminar. We are delighted that you can join us today to help us with our evidence. I should alert you to the fact that we are being recorded and I should also explain that there is a note, I think near the door, of information, if anyone wishes to pick it up, concerning interests and other such matters. Mr Fletcher, would you like to introduce yourself and your colleague?

Mr Fletcher: My Lord Chairman, thank you. Philip Fletcher, Director General of Water Services. On my right is Kevin Ridout, the Principal Engineer with Ofwat.

Q2 Chairman: Thank you very much. Before we launch into the questions we might wish to ask, is there anything you would like to say by way of introduction or shall we go straight into questions?

Mr Fletcher: I would be entirely happy to go straight into it.

Q3 Chairman: I will start with a very general question then. Perhaps you could give us an outline of Ofwat’s role and responsibilities. I think it would be particularly helpful to hear how you think this might change when the Water Services Regulatory Authority comes into existence?

Mr Fletcher: Ofwat’s job is to regulate monopolistic water companies. Like most organisations, we have given ourselves a mission and although you may feel the words have some of the characteristics of mission statements, being a bit highfalutin, nonetheless, if I can just quote them, they are: “to regulate in a way that provides incentives and encourages the water companies to achieve a world-class service, in terms of quality and value for customers in England and Wales.” We have tried to encapsulate in that what we are about. It is very definitely not managing the companies but providing a platform which encourages them to deliver what I think, although it is difficult to compare, is a world-class service, certainly up with the better companies right across the world. We do it by, most obviously, setting price limits and we do so every five years individually, for each company,
for each year in that five-year cycle. We have a duty, which is a primary duty, to enable the companies both to carry out and to finance their functions, which we interpret as meaning as long as they are efficient in the task, it is not our job at the expense of customers to subsidise inefficiency. Also, through the Water Act 2003, we have a second statutory duty, which is specifically to protect consumers, wherever appropriate through the promotion of competition. Then we have a series of secondary duties, including taking full account of sustainable development. We are getting on with the job of promoting competition. There was a new regime again in the 2003 Water Act which takes proper effect from the beginning of next month and a lot of preparatory work has been done over the last two years. It may be that is enough for a starter.

Q4 Chairman: Can you say a word about the changes which will happen when the Water Services Regulatory Authority comes into existence?

Mr Fletcher: When the new statutory authority takes over on 1 April next year, the only change in the duties is that it is an authority, a board, rather than an individual director general. Already all the duties are in place, following the 2003 Act, so there will be no further change on 1 April. The changes that it will make in practice obviously will have to be worked out when the board is in place. It will require probably a more measured, obvious procedural approach within Ofwat to ensure that it is not just a matter of an individual taking the decision but a full board, with part-time, non-executive members in the majority, ensuring that they are in a position to take the key decisions for the water regulator.

Q5 Lord Lewis of Newnham: We are told constantly that there is the possibility of a deficiency in water over the next decades, let us say. This is the sort of nightmare situation which is always being projected for us. This is due partly to climate change, population growth and other factors. How does Ofwat envisage this gap being filled?

Mr Fletcher: First of all, we too see a building up of deficiency. At the moment though across the nation it is not a huge thing, the reduction in non-domestic demand very broadly offsetting what is at the moment a fairly small increase in household demand. This is due partly to increasing use per household but much more to changing demographic circumstances, smaller households, especially people living on their own, using more relatively than people who live in a large household. As we see it, this is very much a matter to be addressed case by case. As we have seen from the drought over last winter and this summer, hopefully offset a bit by what we are seeing in October and November, there has been significant deficiency in the South East, which is the place you would normally expect to find it, you might also normally expect to find it in East Anglia but that has not happened this time. The solution will be a mix of demand side measures and supply side measures, trying to ensure, through a great variety of mechanisms, that particularly households use water more efficiently and to a degree that the additional demand is coped with by providing new supply. The third main, sort of Isle of Man, leg of it is that the companies themselves should be fully efficient in safeguarding the water as it flows through their pipes. Obviously, that is a reference particularly to leakage control.

Q6 Lord Lewis of Newnham: Do you have any concerns with the whole concept of climate change, which after all is long term? It is extremely difficult in your case, I would imagine, making any form of planning for it, but do you address yourselves to this particular problem?

Mr Fletcher: Yes, we do. First of all, we accept that climate change is happening and we accept the huge consensus of expert opinion that it is partly man-made. Then, with all the other stakeholders, we look closely at the UK Climates Impact Programme scenarios, which were updated last in, I think, 2002 and will be updated again in 2008, which increasingly, as understanding grows, should give better indications of what is going to happen region by region as well as across the country. I agree with you absolutely that it is very difficult on a company by company basis at the moment to predict at all reliably just what the necessary countermeasures should be, in terms of water supply. What we are told is that we shall see more heavy downpours, probably concentrated in the winter, and longer, drier summers. That suggests a need to develop new reservoirs, in appropriate cases. Again to focus on leakage, we use a concept, the economic level of leakage, which we think is appropriate to this task, and to focus in all sorts of ways, including perhaps building regulations, appliances’ use of water, to reduce demand where that is appropriate as well.

Q7 Lord Mitchell: I have a question which is more on climate change. It would seem to me that of course it is accepted, or it is accepted by us. What seems to be the great imponderable is the amount of climate change and how it is going to happen and the further out you go it becomes very, very difficult. We read that it is accelerating and it could accelerate on a great basis and I wonder how you factor that into your predictions; it is not an easy thing to do?

Mr Fletcher: No, and I think it would be fair to say that, although in our last price review, which was last year and which set the price limits from 2005 to 2010, we have taken some account of the emerging
picture on climate change, including provision for investigative work on new reservoirs in the South East, we have not, for example, undertaken a massive review yet on the drainage side of the equation. If we are going to get more heavy downpours, it is going to tend to mean that the sewerage infrastructure will get overwhelmed more often than has been the case in the past. That could present a lot of very big issues and very expensive costs if it were ever decided that some general upgrading of existing sewerage infrastructure was necessary.

Q8 Lord Howie of Troon: On climate change, as I understand it, you expect more rain in the winter than we have now and less in the summer than we have now. Does it balance out so that overall it is the same amount of rain?

Mr Fletcher: I think, as Lord Mitchell said, it is extremely difficult to know just where this is pointing. Very broadly, the scenarios at the moment indicate a very rough balance and, of course, in terms of storage, it is in the winter that we need the rainfall, but it would mean more storage in the summer, that is the obvious thing, and therefore potentially more reservoirs.

Q9 Lord Patel: Going back to the question that Lord Lewis started with, it suggests that there are parts of the UK where there will be a deficit, which implies to me that in other parts of the UK there will be an excess. Coming from Scotland, it seems to rain forever. There is lots of fresh water in lochs, they are full of water?

Mr Fletcher: I agree absolutely. We work closely with the Environment Agency and the companies to ensure that the measures which are being taken are appropriate to the region concerned. If I can give an example not too far from Scotland, Northumbria has excess water, partly as a consequence of the development of Kielder Water and then the near disappearance of heavy industry on the Tyne and the Tees. Therefore, measures that will be well worthwhile in the South East and London are not really very sensible up in Northumbria.

Q10 Lord Patel: Is there no possibility of developing a system which delivers excess rain to other areas?

Mr Fletcher: A lot of work has been done to develop at least better regional infrastructure so that local deficits can be made up within a region. Very often the question is raised, “Well, shouldn’t we have a National Grid, as we have with energy, with electricity and gas?” So far, the clear answer to that has been that this would not be worthwhile given the very different characteristics of water and the very significant, both economic and environmental, drawbacks which would attend trying to develop such a grid.

Q11 Lord Patel: Is that an answer which you accept?

Mr Fletcher: Yes, it is. At the moment, I think customers’ interests are best served by encouraging the companies to develop their security of supply, not necessarily simply within their own company boundaries but very much on a regional and a river basin basis. Postulating a much larger National Grid, for example, would require a lot more energy use to pump the water around. It would raise a lot of ecological considerations, because you would have water that was very appropriate in one region coming through to a different one where it could cause problems, and simply at the moment it is not necessary. With appropriate measures, so long as we can anticipate what is coming, we can ensure that at least on a regional basis customers’ needs are met, combining the demand side and the supply side measures.

Q12 Baroness Sharp of Guildford: You have talked about setting prices within a five-year cycle. Do you think that this five-year business planning cycle hinders providers in delivering a sustainable service, and in particular does it allow for sensible, long-term planning and resource development?

Mr Fletcher: The five years obviously is a compromise figure. It is an attempt to strike a balance between the desirability for the companies, and for their customers, of certainty over a reasonable period so that they can plan and undertake work, on the one hand, and, on the other, this is a very long-term business. The development of a new reservoir, for example, may well be a 20-year or even a 25-year thing. Therefore it is not just a matter of planning for five years and then a sort of barrier comes down, it is a matter of planning using the companies’ water resource plans for a 25-year period and taking proper account of that within the five-year resetting of price limits. We are going to be reviewing very shortly whether five years is appropriate or whether it might be slightly longer, but I do not see, and I am happy to explain further, that in the near future we could get it anywhere beyond, say, six or seven.

Baroness Sharp of Guildford: Do you think it would synchronise better with the Water Framework Directive process?

Q13 Chairman: Which is six years, is it not?

Mr Fletcher: The Water Framework Directive moves on a series of six-year cycles, so the first six-year cycle runs from 2009 to 2015, and so on. There is no exact match between the water price setting and the Framework Directive, nor do I think we can
Mr Philip Fletcher and Mr Kevin Ridout

quite get there. It could be a lot worse. Over the next
two to three years the companies and the
Government and the Environment Agency will be
doing a lot of work on river basin management
development and catchment area management
strategies, from which will emerge a programme of
measures, some of which will be appropriate for the
water companies to carry out, some of which will be
appropriately for other polluters to either pay for
or, better still, avoid the pollution in the first place
and I have in mind there agriculture, all of us as
motorists, etc. It does not match exactly. We may
not have a fully developed programme of measures
by the time we have to set price limits in 2009. The
system is capable of coping with some mismatch,
and if I can give you an example of such a mismatch
briefly, the Habitats Directive, which is due to be
implemented over the coming five years, has not yet
reached the point where English Nature and the
Environment Agency are able to say just what the
companies need to undertake to fulfil the Directive.
Therefore we have a change protocol which enables
us to take account of things that happen between
price reviews, it is not ideal but we can take account
of them.

Q14 Baroness Platt of Writtle: Is Ofwat’s focus on
keeping down water prices adversely impacting on
the ability of companies to invest in infrastructure
repair and replacement at a sustainable, long-term
rate?

Mr Fletcher: This is obviously a question which we
debate fiercely at each price review, and sometimes
between price reviews, with the companies. It is one of
the most difficult areas for both the companies
and Ofwat to get a proper grip on. I would answer
very simply, no, we are not putting at risk the long-
term sustainability of these absolutely vital
networks, both the water side and the sewerage side
and the treatment works. We try to avoid any such
risk by focusing on the concept of serviceability. Is
the asset fit for purpose now and is the company in
a position to say it will go on being fit for purpose
into the future or is something drastic going to have
to be done to it? And we publish monitoring reports
each year which assess the serviceability of these
assets. For example, at the moment we are confident
that nationally there is overall stable serviceability,
but for some companies, for some particular classes
of their assets, we do not have that confidence at all.
For Thames Water, on three of the four subsets, we
assess their condition as ‘deteriorating’. For that
reason we have allowed a great deal more in
customers’ bills in Thames Water to enable the
company to replace a lot of the water mains under
London which the last five years has shown are in
not too good a state, cast-iron mains in London clay
which is cracking and bending them. Overall in the
last price review we allowed, I think it is, 22 per cent
more for capital maintenance, £8.4 billion, than we
allowed at the previous review.

Q15 Baroness Platt of Writtle: When you were
talking about Thames Water, obviously at the
seminar it was quite clear that was a very big
problem, and London clay adds to it. My experience
has been in British Gas, where of course there was
moling, there was inside pipe replacement and, of
course, plastic. Are those alternatives going to be
more practical?

Mr Fletcher: They are already practised extensively.
I might bring in Kevin Ridout here. Relining of
pipes is now, for the most part, the favoured method
dealing with a significant bit of capital
maintenance.

Mr Ridout: There are two principal methods, I
suppose, relining and replacing. Some companies
are reluctant to reline because, with the state of the
mains, they think they might as well replace mains
which are in a poor structural condition rather than
reline them. Even so, you are digging pits at either
end of the work and there will be a considerable
amount of disruption, particularly in the urban
environment, like London, with such projects.

Q16 Baroness Platt of Writtle: Are you replacing
with metal again or is it plastic?

Mr Ridout: Generally it is plastic these days. MDPE
is the favoured material.

Q17 Chairman: It is clear, from some of the written
evidence we have had, that while the water utility
companies have accepted the last five-year cycle,
which you agreed with them, or imposed upon
them, according to your language, there is an awful
lot of catch-up, is there not, from previous decades,
where I think it is generally agreed the infrastructure
was not replaced adequately?

Mr Fletcher: It was very clear that nationally we
were not spending enough on maintaining the
infrastructure whilst the industry was in the public
sector. On privatisation, in 1989, the rate of
investment, and this is new and maintenance
altogether, pretty well doubled and there has been
a further step up from 2005 onwards. We expect,
though obviously this will be adjusted at the five-
year price limits, that the companies will need to be
spending at about that level or perhaps somewhat
more in the period up to 2020, which we have taken
account of in the last set of price limits.

Q18 Lord Patel: My question concerns the different
European Directives and laws. First of all, are you
sufficiently, adequately and appropriately involved
every time there is a European Directive proposed?
If you take also, for instance, the European
Framework Directive and Habitats Directive, were you involved? Secondly, what is likely to be the effect of this Directive upon prices? Is there a sufficiently joined-up approach to the whole process?

**Mr Fletcher:** Obviously, it is very much for the Government to lead on this. One of the frustrations for Ofwat, as the economic regulator, is how little account the old Directives took of value. I accept I am a guilty party because I worked as a civil servant in the Department of the Environment when those old Directives were adopted, but really they do not take any account of value. They are all about the cost-effectiveness of particular measures to deliver a stated goal, and of course it is a statutory goal, as we all know, rather than any concern about how much that might cost. With the Water Framework Directive, at least we move on so that the Directive allows governments to take account of disproportionate costs in arriving at an appropriate programme of measures, and that encourages us to hope that cost benefit will be more of a focus as we go forward; hitherto, really it has not been. On the joined-upness, I think we are getting better at it and that ‘we’ means, I hope, of other stakeholders as well as Ofwat. Ofwat does not take a lead in Europe. We have no equivalent anywhere in the European Union. Government takes the lead, very appropriately, and usually on environmental issues its adviser is the Environment Agency, which again is entirely appropriate. We have been drawn in rather more, not least to advise, sometimes with the companies, with the industry, as the European Commission starts to appreciate I think some of the practical and cost issues associated with these Directives. With the Bathing Waters Directive adopted very recently, I think the cost drivers were very influential in the conciliation between the Parliament and the Council in arriving at a sensible compromise.

**Q19 Lord Patel:** Therefore, are you made aware of any new Directives or laws that are likely to be coming out?

**Mr Fletcher:** Yes, we are. Although, of course, we are independent of ministers, once appointed the decisions we take are our own decisions. Nonetheless, we work very closely with anybody we think we should be working with to influence the various European institutions to take account of the customer interests. Again, that does not mean that we are anti-green or anti-environment, it means that we are constantly raising the value banner when an issue is being discussed. Perhaps I can mention here too the very new Consumer Council for Water, previously WaterVoice part of Ofwat, now completely independent, they have more of a frontline role in Europe than we have and we are very happy to support them in that.

**Q20 Lord Lewis of Newnham:** The assessments which have been made about the change in the price required by the new Bathing Waters Directive, actually is this bearing out?

**Mr Fletcher:** It is too soon to say yet, because the Directive will not start to be implemented until, I think it is, 2011.

**Mr Ridout:** The revised Directive is yet to be formally adopted and we do not have a Regulatory Impact Assessment which corresponds exactly with the position reached through the conciliation process. I think the best estimate, if you are after a cost, is probably of the order of £150 million to the water industry. There is another element of cost which will not be borne by water customers but by the agricultural sector.

**Q21 Lord Lewis of Newnham:** What about the Nitrates Directive, has this been implemented?

**Mr Ridout:** The Nitrate Directive is quite an old Directive and principally affects the agricultural sector. It does impact on the water industry in that nitrate-vulnerable zones are designated and that places constraints on the way in which companies can dispose of sludge, so there is a knock-on effect from the Nitrates Directive on the costs of companies.

**Q22 Chairman:** I wonder if we can go back to this very fraught area which you have, to determine the amount of allocation to the water companies for each of the capital projects with which effectively they are bidding for their own money. I believe that for the 2005-2010 round Ofwat allowed £3.16 billion for dealing with supply interruptions. How was this figure of £3.16 billion arrived at? Was a larger sum bid for, did you determine that they were asking too much, how do you set about determining the figure?

**Mr Fletcher:** A larger sum indeed was bid for. They bid for, as they always do, significantly more than we allowed and I am not criticising them for that. I think, yes, there may be an element of gaming in it but also there is an element of prudent caution, conservatism, in trying to ensure that they have covered all the angles. It is Ofwat’s job to ensure that no-one is put in a position to run risks with this crucial set of services to their customers but at the same time that customers pay no more than they have to. We arrive at the £3.16 billion not by saying “That is the figure, now let’s split it up,” but by looking at each company’s business plan, looking in this case at the significant increase in population and

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1 European Commission statement—“Following conciliation the Member States have to ensure that all bathing waters will achieve at least 'sufficient' status under the new Directive by the end of the 2015 bathing season.”
households expected in the South East and generally
in the south of the country and arriving at a
judgment which, wherever we could, we based very
closely on the company’s business plan. I say
wherever we could, wherever that plan seemed to us
soundly based, that was what we took as our
starting-point. My Lord Chairman, as you have
already indicated, the companies had the option of
referring these price limits on to the Competition
Commission. Basically, they have accepted the
rough and the smooth, as I am sure there were
within those price limits, and none of them has gone
on to the Commission.

Q23 Lord Taverne: How good are you at second-
guessing the companies’ own plans?
Mr Fletcher: We think we are quite good. The
reason we think we are quite good is not that we are
as good as the companies at managing their
business, we try very hard never to do that, but our
strength is that we have 22 from small to large water
companies plus one tiny one and we compare them
one with another. We seek to exclude circumstances
that are special to a particular company. That way,
building up the evidence now over 15 years since
privatisation, we have a lot of confidence in our
comparative data. We think on the basis of that we
can set price limits which challenge particularly the
less efficient companies to catch up with the best, in
the confidence that the best are already there at the
frontier and then we push the frontier a little bit
further on.

Q24 Baroness Platt of Writtle: I want to talk about
your own relationship with the Environment
Agency. You said earlier that you are not anti-
environment, but obviously there are objectives
which they had which would appear to conflict with
some of the objectives which you had. Specifically,
I wonder what your view is of the Environment
Agency’s policy of repealing some of the abstraction
licences. How necessary will a reduction in
abstraction that will cause be, and how will you fill
the deficit that it will create?
Mr Fletcher: On the relationship generally, Baroness
Young and I enjoy a little sparring match sometimes
because we are coming at the issues from somewhat
different directions, but it should not be
exaggerated. Both of us have duties in relation to
sustainable development. We see our job as not
about holding down prices to an absolute minimum
but about ensuring value for customers, balancing
all the issues, economic, social and environmental,
which need to be taken into account. At working
level we have a very close working relationship with
the Environment Agency and very often you will
find us lined up on one side of a table with the
company on the other making very much the same
noises about the particular imperfections of that
company. The main issue, I suspect, is about value.
As the economic regulator, we are constantly
pushing to say we are after value and we want to
ensure that within the environmental sphere value is
obtained just as much as in relation to the social
issues in setting water prices. When we come to
water abstractions, obviously that is very much the
Environment Agency’s task, working with
government. We are pleased that the basis of
compensation for repeal or constraint on
abstraction has now been set on an equitable basis
and we welcome that. We are concerned obviously
about the implications of curtailing abstractions for
supply. That is one ingredient in some of the issues
that were under discussion earlier, about ensuring
that in particular areas customers continue to be
provided, even if for environmental reasons there
has to be some further constraint on abstraction.

Q25 Baroness Platt of Writtle: When the companies
tell you that they cannot go on taking water out of
a particular source, what then do you advise? How
do you make good the deficit which then is created?
Mr Fletcher: It will depend very much on the
circumstances. It might help to give a practical
example. Government has in front of it at the
moment an application for water-scarce area status
from Folkestone and Dover Water Company, one
of the areas with Thames which faces the most
significant constraints and is most at risk of failing
to hit the security of supply index. In Folkestone’s
case, in reviewing their water resources plan and
preparing their business plan for the last price limits,
uniquely they proposed that they should be given
water-scarce area status, which requires the
Secretary of State’s approval. That would enable
them to meter selectively, in other words,
compulsorily, their customers, something they used
to do before 1999. I think, but at any rate the date
at which optional metering came in. We and the
Environment Agency, in giving our advice to the
Secretary of State, as I understand it, are both
supporting the water-scarce area application, noting
that one of the reasons to give it justification is that
the Environment Agency is having to curtail one of
the sources on which at the moment Folkestone
relies. That is only one factor among several which
we believe will justify the grant of this right to meter
selectively.

Q26 Lord Howie of Troon: During the passage of
the Water Act, a year or two ago, I had some
interesting conversations with my colleague, Lord
Whitty, who is sitting beside me here, looking at me
ruefully, about the clear distinction between the
abstraction of water for domestic and industrial use
where it disappears, so to speak, as against the
abstraction of water in the dewatering of quarries, where it goes back into the regime almost at once. He won the argument. What do you think? He was wrong, by the way, but never mind.

Mr Fletcher: I may turn to my right in a second. The dewatering issue, obviously, a lot depends on what use you can make of the water once you have removed it and a lot of the aquifer, as, Lord Howie, you know far better than I, is contaminated by what we have been doing to it for 200 years. We need to rely on the companies, working with another, fellow regulator, the Drinking Water Inspectorate, to ensure that the water abstracted and then treated is appropriate for whatever use it is put to. If we can find aquifers which can be developed as another source, that might be an opportunity in some cases to develop competition, direct price competition, and in other areas to help with the abstraction problem.

Mr Ridout: I cannot really add anything to that.

Q27 Lord Howie of Troon: You did mention, of course, purification. That applies earlier on to your comments on the grid, when you mentioned the different kinds of water and how it all got mixed up, to purify it we had better boil it. This distinction has put an undue burden on the quarrying industry, do you not think, even in the mildest possible way?

Mr Fletcher: My Lord Chairman, may I say that really I do not know enough about this one to offer an expert view.

Q28 Chairman: I think I will ask Lord Howie to ask this question of Baroness Young when she comes before us. Can I come back to this question of the Environment Agency asking for the overabstraction licences to be repealed, which obviously they are asking for environment reasons. There could well be disadvantaged communities, and perhaps Folkestone and Dover would be one of them, where, because of the inability of the water company to extract, some consumers are going to be disadvantaged. Is that a matter which is of any concern or relevant to Ofwat’s operations?

Mr Fletcher: Certainly we are concerned about any customers who are disadvantaged and would look to both the Government and the Environment Agency to approach the issues of abstraction in a balanced way, which I am pleased to say they do, so that good warning is given if there needs to be a constraint on an existing licence and time allowed to develop alternative sources or alternatively demand side constraints to cope with the problem. I do not see any sign at the moment of something happening sufficiently suddenly by way of abstraction control to put domestic customers at immediate, short-term risk.

Q29 Lord Lewis of Newnham: Presumably, the reason for the abstraction control is that in the long run it is going to benefit?

Mr Fletcher: Yes, indeed. If we take the Habitats Directive again, quite a lot of the reductions in abstraction are about ensuring that our wetlands are properly protected. As the Committee will know, they are already so much smaller than they were 50 or 100 years ago, that what is left is particularly precious. Although it is very hard to put a value on it, certainly I do not deny that it is extremely valuable and anyway it is a legal requirement that it be protected. There will be constraints on abstraction and quite a lot of the work that may turn up between now and 2010 may result from that sort of abstraction control as the Habitats Directive comes into effect.

Q30 Lord Broers: You mentioned earlier on the economic level of leakage. Will you please explain what you mean by that and is there clarity amongst all of the stakeholders about this definition?

Mr Fletcher: I believe there is a very good understanding now of what it means, and we see it as an invaluable tool to ensure that companies control their infrastructure, their water mains, in such a way as to reduce leakage to the point where if they reduce it any further it would actually be better to develop a new source of supply. As the Committee is already aware, it is not feasible to reduce to nil leakage on this particular network, with its thousands of kilometres often of old pipes, but even more with millions of joints, and the resources are not such, as with petrochemicals, for example, where you have to conserve every jot. In fact water does some environmental good but there is some leakage. Having said all of that, it was far too high a decade ago. It has been reduced by about a third and most companies now are operating at or very close to their economic level of leakage. Those that are not, I have in mind particularly Thames Water and United Utilities, are under very severe pressure from us and from their customers to bring the control of their networks to the point where they too achieve the economic level. The Environment Agency and Defra and I were speaking at a leakage conference and all of us were saying the same thing from different perspectives. I believe the concept generally is accepted and I believe that is so because it is not, as the word ‘economic’ might suggest, a purely financial consideration, it can take full account, for example, of the issue we were just discussing around abstraction control. If the Environment Agency has to reduce abstraction then the economic level of leakage for the company concerned will adjust accordingly. It will be more worthwhile reducing leakage as an alternative to developing a new source
which otherwise might be necessary because of the abstraction reduction.

Q31 Lord Howie of Troon: Depending in which part of the country it is, some of the leakage goes back into the system and refills the aquifer, and so on, and really could be described not as leakage but as refurbishment?
Mr Fletcher: Of course, a lot of our sewage could be described similarly.

Q32 Lord Howie of Troon: Have you any way of measuring how much of your leakage is actually leakage and what is not, in the sense that I have described it?
Mr Fletcher: I will perhaps invite my colleagues to think about that. I do not know that we can come up with that measure. What we can do is use various different measures, particularly litres per property per day, and then a measure which takes account of the length of the network, to assess each company by comparison with the others to deduce where they are and from that to exercise appropriate pressure on them to control their leakage effectively in the interests of their customers. If they are operating at the economic level of leakage then their customers do not have to pay extra because the company is only doing what it needs to do in its own economic interest.

Q33 Lord Howie of Troon: I think I understand that, just. The water companies attempt to promote water efficiency in a number of ways. How good do you think they are at it?
Mr Fletcher: They are getting better at it. We report on leakage, security of supply and their endeavours on the efficient use of water in an annual report. We have sent to the Committee our latest report, it appeared last month, and we record in that what it is that they are doing. For example, over the last five years they issued over two million of these devices to put in old-fashioned cisterns and thereby reduce the unnecessarily large flushes on the old systems. I think one of the main problems about their work on water efficiency is that only a quarter, 26 per cent, of households are metered. I think it is extremely difficult to persuade customers to control their water use unless what they pay is related to that water use.

Q34 Lord Howie of Troon: Do you think that customers should be rewarded in some way for reducing their consumption? I do not mean merely by just paying for what they use but actually are rewarded, by giving them something like a CD perhaps?
Mr Fletcher: One of the interesting surveys which have been done recently suggests that customers in the South East, at least on a self-assessment basis, really have been trying to do something. They have taken on board that it has been a very dry winter and a very dry summer and they have been observing the hosepipe bans, sprinkler bans, in the areas directly affected and they have been taking some pride, and justifiably so, in the fact that they have been taking unusual steps to reduce their use of water. I think the pride in contributing in that way is also a reward. I do not know that they should be getting a CD because then we would be getting into the business of how you measure what contribution they have made, what they have reduced from, and again we are back to metering. Unless we meter it is very hard to say what they are really achieving.

Lord Howie of Troon: I think that is a very sensible remark, if I may put it that way.

Q35 Chairman: Can you explain why you are opposed to a potential water savings trust?
Mr Fletcher: A water savings trust is an idea which is propounded particularly by my colleagues in the Environment Agency as a means, parallel to the Energy Saving Trust, of encouraging water savings. My difficulty with it is a general one, as a public servant, about feeling that we have an awful lot of quangos. This one would cost rather more than Ofwat and the Consumer Council for Water combined, just to start off with. It would be there to encourage water saving and install meters for some customers and then measure what they saved. My hope is that this desirable objective can be achieved without public money, without either the taxpayer or the water customer having to pay more for it. I was, this morning, as were members of the Committee, at the launch of Waterwise, elsewhere in this building. Waterwise is financed by the industry but independent of the industry, not costing the customers any more, to draw together good practice, to disseminate it properly, to encourage water efficiency across the board, and I think that is a very sensible first step. I would hope we would not need to move on to a water savings trust. I think that might also reduce the accountability of the companies for their own duties on water conservation and promoting water efficiency.

Q36 Lord Taverne: Your answer seems reassuring because there is a lot to be said for keeping it simple, but since metering is probably one of the most effective incentives, what more can be done to spread metering? I am rather discouraged to find that only one quarter of customers actually have water meters.
Mr Fletcher: The proportions vary considerably from company to company and, as you would hope, the lowest percentage I think is in Northumbria,
where the problem is least, and the highest percentage at the moment is in East Anglia, where potentially it is one of the highest. South West Water is rapidly overtaking East Anglia because there the bills are highest. I am in favour of metering, as I have said, in order to alert customers to what water is costing them and thereby to create a real link between cost and use. I think it will be particularly valuable in the areas under most pressure for security of supply, hence my support for the Folkestone application. There is a very interesting question of whether the current statutory position, whereby customers can opt for meters and the company must install them free to that customer as long as this is practicable, is enough, because inevitably those who opt may well be those who have high rateable values and will not actually save a great deal of water. At least it is something and at least it is tending to happen in the areas where it will do the most good. My hope is that it can be supplemented perhaps by wider use of the scarce area measure, if that can be done more simply, so that metering really can be used as more of a precision tool than the rather blanket instrument it is at the moment.

Q37 Lord Mitchell: My question really is a follow-up, in some ways; we have covered some of the ground. To what extent would you consider universal water meters in a specific area and do you have evidence that it would result in long-term behaviour amongst customers? We are very interested in how customers behave concerning this and therefore would it have a long-term effect on demand?

Mr Fletcher: On the first issue, as I have said, I do not think it would be good value to have universal water metering right across England and Wales as one blanket thing, but the pepper-potted optional metering is very inefficient as a means of installation. If we think back to natural gas conversion, you could do it street by street and you had the economies of scale. There is value in that. Where it is justified, the cost per meter should come down considerably. I think it should be applied in the areas of greatest need. The effect on demand is hard to predict. There have been a number of studies. The biggest blanket study was the universal metering of the Isle of Wight, now some time ago, and the finding was that the saving was around 11 per cent overall per household, on average. Probably optional meter switchers may tend to save a bit less than that at the moment, maybe it would be rather more than that, especially combined with good education programmes, which I think are a necessary part of the overall mix, to encourage customers to save. Then you add in perhaps building regulation changes in the areas of greatest need, perhaps new regulations on appliances, which particularly would be useful again in the same areas, boilers, for example, dual-flush toilets and other measures, dishwashers that do not use vast amounts of water, for example.

Q38 Lord Howie of Troon: I have always been in favour of water metering, if only because at an early, insecure part of my life I was Member of Parliament for Luton where they were made and it seemed significant that I should be in favour of them, but I am anyway. I have two houses, one of them near Beachy Head, which has a low rateable value, where we have compulsory metering, and the other in north-west London, which is, I hesitate to say, a rather high rateable area, which has optional metering. My experience is that this has made no difference at all to my use of water. I wash my face when it appears to be necessary, and so on. I use water as and when water is needed and the question of whether it is metered does not enter my head. Am I abnormal in some way?

Mr Fletcher: My Lord Chairman, I am quite sure Lord Howie is in no way abnormal. You are at one end of a spectrum. Not to alter your behaviour at all would be I will not say unusual because there will be plenty of people like that, but there will be the other end of the spectrum where people are almost excessive in their saving of water. Water is still a relatively inexpensive resource. I have to say that with care, because bills have just gone up a lot and I am very conscious of that, but it is still a relatively small part of the overall household costs for most customers, with exceptions in the South West. Behaviour is going to vary and the average saving will be very different and when you have got teenagers in the household who take three power showers a day, or where you are very attached to your garden, all of that is going to make a lot of difference to the way people behave. Metering, I think, is a step which brings everybody together, to the extent that at least it should make everybody think a bit more about the precious resource which they are using.

Q39 Lord Howie of Troon: Have you actually found and identified what I might call ‘meter freaks’?

Mr Fletcher: The studies which have been done, and I have mentioned the Isle of Wight one, there have been subsequent studies, show a wide variation in customers’ reaction to the installation of a meter.

Q40 Lord Whitty: I have two points, just before we leave the efficiency of water use. Do you think that anything equivalent more or less to the Energy Efficiency Commitment would be appropriate and workable for water? In the Energy Efficiency Commitment the energy supply companies have
some obligation to persuade their customers to adopt efficient measures.

Mr Fletcher: That is there, in the water field. They have a duty to promote water efficiency to their customers.

Q41 Lord Whitty: Yes, but there is not a specific target?

Mr Fletcher: There is not a specific target in relation to water, and we are back again, I am afraid, to the fact that we do not know just how much three-quarters of the domestic customers are using, so it is very difficult to say “There is a starting-point here and our efficiency drive has made this amount of difference.” The companies do try to measure the effect they are having but it is much more subjective than it can be with the Energy Efficiency Commitment.

Q42 Lord Whitty: My other question relates to the demand side. We have talked about climate change and population growth but actually the demand arises in particular areas and a lot of it arises because of housing and other developments in particular areas. There is a lot of concern about the ODPM’s plans for housing development, particularly because it is mainly in the south-eastern areas of high water stress. What is the relationship of Ofwat with the ODPM’s planning process and do you have any concerns about that, and do the water companies have concerns about that? You referred to it briefly earlier that there had been some consultation between yourselves and the Environment Agency. Is there an area there where Ofwat needs to be locked in to decisions by other government departments?

Mr Fletcher: It is fair to say that we were not consulted before the initiative was announced and we would not have been the first people to have been consulted because the most obvious group would be the companies themselves and then the Environment Agency. Having said that, we are talking now rather more to the ODPM and to the regional assemblies about specific proposals as they start to emerge and our role, I think, again, is to draw attention to this point about value. It is not that water cannot be provided to extensive new developments in the South East but there is a price attached to it, a price which is not simply money but also environmental costs, and obviously the Government in taking its final decisions and the planning authorities in their involvement need to be in a position fully to weigh those various costs and benefits one against the other. At the end of the day, we will be enabling the companies directly affected by the Sustainable Communities Initiative to provide the new developments with the water that is needed, helping and encouraging all those involved to ensure that these new developments will make as little impact as possible on the water stress position. Where we are talking, as we are, about big, new developments, really there are opportunities there, real economies of scale, to go for devices and designs which will hold down water use significantly, and obviously our hope will be that full advantage will be taken of that.

Q43 Lord Whitty: I think I am right in saying that the water companies, as you rightly say, which are at the front end of this, are not even statutory consultees in that planning process?

Mr Fletcher: That is correct.

Q44 Lord Whitty: Do you think that is a problem?

Mr Fletcher: I know there has been a big debate about the Environment Agency. The water companies, I think, take a mixed view about this. Some of them see that there could be a huge load of extra work, for which they would not be remunerated, or rather they would come to me to say “Customers’ bills should go up” and they are very doubtful about the overall balance of advantage in terms of the buttons they can press. What I think is happening and what I think is probably more valuable than necessarily a statutory consultee right is that in the stressed areas the companies and the local planning authorities are starting to talk to each other much more closely, with the Environment Agency also as a main player. I think that is likely to be the most cost-effective way forward, if really they are talking to each other closely.

Q45 Chairman: It would not surprise you, I am sure, to hear that in the written evidence we have received from some of the water companies they make a plea that indeed they should be consulted more often by the ODPM and other planning authorities. They feel, I think, that they must have some justice in this, that if they are to do their long-term projections they need more accurate data and some better-informed forecasts?

Mr Fletcher: I would support them fully, in terms of these big, strategic developments. Really they should be fully consulted when these very large developments, in some cases, are still only a gleam in the eye and when there is a full opportunity to take the water position, both the drinking water and the waste water, into account. I was talking more about being a consultee on what will often be hundreds, thousands, of very small applications. For the strategic ones, if those can be separated out then I would support very firmly the fullest consultation and the right to be consulted.
Q46 Chairman: If we are talking about just at strategic level, you would wish to see the water companies more involved by government and by planners in all effective forums, and also Ofwat?  

Mr Fletcher: Ofwat is there to hold the rein financially. We will keep in close touch through the Environment Agency and the companies but also we need the other links. Hence the developing contacts with the Greater London Authority, both the Mayor and the Assembly, the Eastern Regional Assembly, the South-Eastern Regional Assembly and, of course, the links directly with government, which, as a fellow government department, although not a ministerial one, are very important to us in ensuring that we are alive to and are able to advise on potential, new initiatives.

Q47 Lord Taverne: Your office was set up to deal with the problem that water is described as a natural monopoly. In practice, do monopolies which the companies enjoy distort the market in terms of costs and services to customers, and can you envisage an increasing amount of competition, for example, perhaps through using inset arrangements for domestic customers?  

Mr Fletcher: Certainly I can envisage price competition truly coming in through the new tailor-made regime which is enshrined in the 2003 Water Act and which we shall be testing properly from 1 December. At the moment, as you will know, the Government has confined the application of that regime to the very largest business users, a hospital trust, a university, a very big industrial plant, for example, so the potential market is very constrained, we are talking about only 2,000-odd major potential customers. I would hope that if this works, and I believe it should, and new entrants are able to come in, stimulate the incumbents and provide a better service to these large business customers then the Government will be prepared to reduce that threshold, to extend it to a wider group of business customers. Domestic customers are more difficult. I am afraid, partly, we are back to this issue again of actually measuring what it is they are using. If we had a substantial majority of metered customers perhaps that would start to become more of a reality. As it is, it is a reality, potentially at least, for major new housing developments, where we have one or two cases where a new entrant has gained from us an inset appointment and there are others which are under discussion. An inset means simply that the entrant company effectively itself has a monopoly but in a very small area, usually, of provision to the particular developer or business user concerned. Just how well it is going to work we will have to see but our comparative system is always a mimic of competition, it can never have all the dynamics of a true market, and I shall take very seriously our duty to promote competition where it is in customers’ interests to do so.

Q48 Baroness Perry of Southwark: I wonder how you go about determining the interests and priorities of the consumers. Obviously, I realise you have direct relationships with the companies rather than the consumers, but in order to perform your function with the companies you need to know about the consumers. Allied with that, what is the nature of the relationship that you are forming with the new Consumer Council?  

Mr Fletcher: We see it very much as our job to protect customers and consumers. It is now enshrined in the statute in a very specific way, which was not true before 2003. Ensuring that customers are paying what they need to, but no more than they have to, to receive a good service seems to us an absolutely crucial part of our job. Our relationship with the Consumer Council for Water is obviously in a state of development at the moment. It was set up from 1 October and obviously it is a seminal moment for Ofwat, because although the old WaterVoice was always free to criticise us, to reach its own policy view on any issue and did so, nonetheless, for budgetary purposes, it was all part of Ofwat. We have now a totally independent body, under Dame Yve Buckland, and we have got the relationship, I believe, off on a very good footing, with CCWater representing customers, Ofwat looking to protect them and working together so that we do not duplicate each other’s work, and we will be looking to develop that as we go forward. On some issues, I have mentioned Europe, I see CCWater as leading, on others, the straightforward economic regulation, we shall lead but we shall consult closely with CCWater as we do so.

Q49 Baroness Perry of Southwark: Can you expand a little more on the mechanisms whereby you find out what customers want?  

Mr Fletcher: One obvious way in which we find out is through customers who are unhappy and the complaints which come to us, sometimes from Members of Parliament, sometimes directly from customers, we do pay a lot of attention to and we try to ensure that they get a proper answer. We also monitor closely, and here it is CCWater in the lead, the complaints that the companies receive and the complaints CCWater receive as one indicator of the performance of the companies concerned and they have to observe certain standards in the way that the companies actually handle those complaints, the speed of reply, the adequacy of reply.

Q50 Baroness Perry of Southwark: Do they analyse them and keep a record?
Mr Fletcher: Yes, they do. It is difficult to analyse them in a wholly systematic way, because obviously the nature of the complaint will vary quite a lot, but we have specific categories of complaint. You will not be surprised to hear that bill-related complaints went up this year, with the very big rise in prices effective from April. That is not enough. We need also to get as good a take as we can on what customers as a whole are thinking, and there we use opinion surveys. In advance of the last price review we conducted a double-take review jointly with then WaterVoice, with the companies, with the Environment Agency and with government, in fact all the main stakeholders, even the non-governmental organisations representing the environmental side, the RSPB, were part of that set-up. The questions were formulated together, it took an age but we agreed on them all, and the results were owned by all of us, and the findings were, very broadly, that three-quarters of customers are broadly happy with the services they are receiving from their company and—important message—did not want to pay a lot more for enhancements to the service. Although we have disappointed them on that, we took the message on board, but with one significant exception, improvements on sewer flooding, they were not looking for a general raising of the standards of service which they were receiving.

Q51 Chairman: Mr Fletcher, commendably, several times you have demonstrated your concern to protect customers and consumers from further burden on water bills, but if we are to have further water efficiency measures who is going to pay for them, they cannot all be delivered for free? Should it not be the customer; should it be the taxpayer? Mr Fletcher: I do not think it should be the taxpayer, which comes back to my earlier answer about the water savings trust. I believe the Environment Agency argues that this should be another taxpayer-financed quango. For what it is worth, I do not think that would be appropriate, I do not think it would be value for money. Should customers be paying more, now we are back to the issue, I am afraid, of metering, because, although an individual customer can say “I opt for a meter” and have it installed without cost to them, all of us, as the body of customers, pay for the additional costs associated with the installation of the meter and then with the ongoing maintenance of the meter, its reading at regular intervals, and so on. There, I think, there is no other recourse but to the customer to pay for that water saving, so I see the customers as the appropriate body to bear the additional costs, as long as the companies are being efficient in their own approach to their own task of water saving. For example, they should be providing a base service of educating their customers and promoting water-efficient devices, not at the price of additional increases in bills but as part of their base level service already taken into account in the bills which we all pay.

Q52 Chairman: I think we have come to the end of the questions we wish to put to you. Unless any of my colleagues wish to come back on a quick one, I would like to say, on behalf of the Committee, how grateful we are to you and your colleagues for joining us today and for the very informative answers you have given us. If, on reflection, there is anything you would wish to add, do please send it in to our office, through the Clerk, and we would be delighted to have it on the record. Mr Fletcher: Thank you very much, my Lord Chairman. I am conscious that I am the first witness on this inquiry. We shall read closely the transcripts of fellow witnesses as they go through, and if there is anything to add then we will be in touch with the Clerk.

Chairman: I could have said that we are on a learning curve, but of course we started that at the seminar so we are well advanced now thanks to your evidence. Thank you for all your help.
Memorandum submitted by Water UK

1. Defining the Problem

1.1 What are the causes of the current problems of water supply, and how serious are they?

1.1.1 In the UK, public water supplies come from underground sources via boreholes or springs, direct from surface waters including rivers and lakes, or from rainfall collected in reservoirs fed by rainfall in the catchment. Used water is returned to the environment after treatment but usually into surface waters which do not always replenish drinking water sources. There is little direct water reuse in UK although indirect reuse is possible via surface waters.

1.1.2 All water companies have arrangements in place to collect, store and transfer water to cope with normal fluctuations in rainfall. In a drought these established arrangements may not be enough to ensure full supplies for an indefinite period ahead. A shortage of rainfall over a period will mean that water available for abstraction from rivers or the ground, or water in storage may be less than is desirable to ensure security of public water supply.

1.1.3 Southern England has experienced one of the driest winters and spring periods since 1904—in some places only the winter of 1975–76 was drier. Hampshire, Sussex, Kent and the Thames Valley have had only about two-thirds of average rainfall since November 2004. It is worth noting that southern England has less rainfall per head of population than some north African countries.

1.1.4 Although public water supplies are not immediately at risk hosepipe bans have been necessary in some areas to safeguard supplies into the autumn and to avoid shortages next year if there is a continuing trend of low rainfall.

1.1.5 Over the country as a whole reservoir levels are 12 per cent lower than at the same time last year at around 72 per cent and most river flows were below long term average flows in August.

1.1.6 Groundwater levels are also falling and this is particularly so in the chalk aquifers which are so important to Southern England. Above average rainfall in August reduced demand but had little impact on resources. We really need to see rainfall figures 25 per cent above average for the key rainfall period between October to March, in order to replenish our underground supplies.

1.1.7 Low river flows and groundwater levels across Southern England have also resulted in environmental problems and a balance must be struck with the need for abstraction for public water supply.

1.1.8 There is a statutory requirement under the Water Act 2003 for Water Companies to prepare and maintain a drought plan that details the actions it would take in the event of a drought to ensure the supply of wholesome water and to protect the environment. The drought plans use indicators such as low rainfall, low reservoir levels or high demand, which trigger actions such as more intense publicity for using water wisely, a focus on leak reduction in specific areas, bringing a new or dormant supply into use or in extreme circumstances applying restrictions on use. Currently restrictions on use have been imposed by four water companies in areas with specific problems, for example Weir Wood reservoir in Sussex, which serves 60,000 people and is fed entirely from rainwater is currently only one third full and there is no augmentation source. The reservoir provides flow to the River Medway and the water company has been granted the first drought order in the UK for 8 years to allow it to reduce this outflow.
1.1.9 Demand for water is also important. Obviously this increases in a dry summer through use in garden watering, swimming pools etc. There have also been demographic and social changes, modern lifestyles result in a greater demand for water. There has also been an increase in smaller size households that use proportionally more water, together with a general increase of population and economic activity in the South East of England.

1.1.10 Most water companies reported stable or reducing demand in August reflecting the localised nature of the drought. Whilst companies in the north generally have adequate reserves, a number of companies in the south and east are seeing continuing low rainfall conditions that require management under their drought plans with four companies placing restrictions (hosepipe or sprinkler bans) on water use.

1.1.11 Water companies have a statutory duty under the Water Resources Act 2003 to promote water efficiency and manage demand. They also have targets to reduce leakage from pipes. Leakage is discussed in detail in our response to questions 2 and 3.

1.2 What are the projections for future water supply?

1.2.1 Water company initiatives such as water efficiency campaigns and leakage reduction strategies are designed to reduce the increase in demand resulting from social and demographic changes. Direct charging using meters can also have an impact on demand, though further research is required to confirm a long term reduction in demand.

1.2.2 The biggest concern to the water industry is the impact of climate change as predicted by UKCIP. Global warming due to increasing emissions of greenhouse gases is likely to result in statistically warmer drier springs, summers and autumns and mild wet winters. The impacts will be most noticeable in the South East where problems are already evident. This is also forecast to result in rising soil moisture deficit which will mean that agriculture will require considerably more water and competition with the water industry for increasingly scarce resources.

1.2.3 Another concern is that increasing areas of impermeable surface resulting from urbanisation reduce the quantity of surface water which can infiltrate into the soil and replenish groundwater. It is essential that modern communities are designed with sustainable urban drainage systems which allow infiltration rather than a rapid discharge to surface water systems.

1.3 Is sufficient research being devoted to predicting and handling future scenarios?

1.3.1 The water industry channels research funding through its research organisation UKWIR (UK Water Industry Research Ltd). UKWIR sponsors research both on its own and in collaboration with a range of other organisations including the Environment Agency and Defra. Recent and on-going research projects are listed below.

Current UKWIR water management research projects

— Peak Water Demand Forecasting Methodology
— Reservoir Catchment and Impoundment Management
— Assessment of Climate Change Scenarios for Water Planning at the Resource Zone Level
— Effective of Seasonal Variations and Climatic Extremes on Leakage
— Natural Rate Rise of Leakage
— Effect of Climate Change on River Flow and Groundwater Discharge
— Framework for Developing Water Re-use Criteria for Drinking Water Supplies

1.4 Is the response of Government, the EU, Regulators and the Industry adequate?

1.4.1 We welcome continued funding of UKCIP by Defra. Their scenarios are becoming increasingly more detailed and useful. The Environment Agency is looking at future climate change and water resource scenarios and sufficient funding must continue to be made available to enable them to do this. In particular, the flooding risk maps produced by the Agency will take account of climate change scenarios but are not yet available, apart from the south east of England risk map which was fast-tracked.
15 November 2005

1.4.2 We do not believe that sufficient attention was given to impacts of climate change within the recent Periodic Review (PR04).

1.4.3 An EU directive on responding to climate change may be necessary to ensure that Member States start planning and develop both adaptive and mitigating strategies in respect of protection of water resources.

1.4.4 The ODPM must ensure that new development takes into account water resources and this has been recognised in respect of sustainable communities.

1.4.5 No new reservoirs have been constructed in the UK since Kielder in the 1970s. We have to accept that new facilities will be essential to meet the demands of the 21st century and the planning regime must facilitate this. Water UK supports a twin-track approach to meeting future demand, ie demand side management, leakage reduction plus resource development—but that approach must be concurrent not consecutive.

1.4.6 The water industry has set up ‘Waterwise’ to make a positive contribution to improving water efficiency.

2. Supply and Demand

2.1 What are the options for increasing water supply and what are the arguments for and against?

<table>
<thead>
<tr>
<th>Option</th>
<th>For</th>
<th>Against</th>
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<tr>
<td>New reservoirs</td>
<td>— Reliable yield</td>
<td>— High capital costs</td>
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<td></td>
<td>— Relatively low operating cost</td>
<td>— Planning issues</td>
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<td></td>
<td>— Creation of new amenity, recreational facility</td>
<td>— Environmental concerns</td>
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<td></td>
<td>— Loss of land</td>
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<td>Dam raising</td>
<td>— Low operating costs</td>
<td>— Dams not always suitable</td>
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<td>— Yield may not necessarily increase</td>
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<td>— Further land loss</td>
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<td>— Environmental concerns</td>
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<td>Pumped storage</td>
<td>— Relatively low capital cost</td>
<td>— High operating costs</td>
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<td></td>
<td>— Better use of existing storage</td>
<td>— Not all reservoirs are suitable</td>
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<td></td>
<td>— Low environmental impact</td>
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<td></td>
<td>— No loss of land</td>
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<tr>
<td>River intakes</td>
<td>— Little or no summer yield</td>
<td>— Low capital cost</td>
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<td></td>
<td>— Low capital costs</td>
<td>— Poor water quality</td>
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<td></td>
<td></td>
<td>— May have environmental concerns</td>
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<tr>
<td>Licence changes</td>
<td>— Virtually no costs</td>
<td>— Environmental concerns</td>
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<tr>
<td>Boreholes</td>
<td>— Usually good quality water</td>
<td>— Not all areas suitable geologically</td>
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<tr>
<td></td>
<td>— Incremental developments possible</td>
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<td></td>
<td>— Low environmental impact</td>
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<td></td>
<td>— Relatively low capital costs</td>
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<td></td>
<td>— Relatively low operating costs</td>
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<tr>
<td>Aquifer recharge</td>
<td>— Low environmental impact</td>
<td>— Not all geology suitable</td>
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<td></td>
<td>— Relatively low capital costs</td>
<td>— Mixed results from trials</td>
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<td></td>
<td></td>
<td>— Can form part of water re-use</td>
</tr>
<tr>
<td>Conjunctive use</td>
<td>— Effective use of existing system</td>
<td>— Complexity of operation</td>
</tr>
<tr>
<td></td>
<td>— Low environmental impact</td>
<td>— Water transfer costs high</td>
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<tr>
<td>Bulk transfers</td>
<td>— Effective use of resources</td>
<td>— Adjacent areas may not have surplus</td>
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<tr>
<td>Water grid</td>
<td>— Evens out surplus/deficit areas</td>
<td>— High operating costs</td>
</tr>
<tr>
<td></td>
<td>— Low environmental impact</td>
<td>— High capital costs</td>
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2.2 What are the likely future trends in water demand, and what can be done to manage demand more effectively, and to influence the behaviour of consumers and others?

2.2.1 Water companies have developed detailed demand forecasts using national methodologies agreed with the Environment Agency. The methods use micro-component approaches to assess each and every component of demand. Forecast accuracy has improved significantly as a result and all companies produce forecasts for at least a 25 year planning horizon. Demand forecasts vary across the country with some reductions in demand anticipated in the North of England whilst the South anticipates some growth.

2.2.2 Leakage from water company supply systems has been reduced significantly over the last 10 years. Companies are now operating at or very close to the economic level of leakage. As leakage levels reduce, the remaining leaks become more difficult to detect or control.

2.2.3 All newly-built houses in England and Wales have been metered since 1989, and all water companies offer a free meter option for household customers who wish to switch to metering. As a result household meter penetration has increased substantially over the last decade and will continue to increase. In parts of South and East England, faster meter penetration on the basis of change of occupier metering programmes will contribute to the supply-demand balance. The industry is currently engaged in research to verify the assumptions for the impact of metering.

2.2.4 Water companies have carried out a significant amount of customer education and promotion of water efficiency (a statutory requirement), and issued large numbers of customers with free water saving devices (e.g. cistern devices to reduce toilet flush volumes, and water butts and hosepipe “trigger guns” to reduce water use in the garden). Many companies have also undertaken household audit programmes by which individual homes are visited, water saving devices are fitted (e.g. cistern device, low-flow tap inserts), dripping taps are repaired and water saving advice is provided.

2.3 What contribution can science, engineering and technology make towards reducing water use or waste by households, businesses and the public sector?

2.3.1 Currently installed water meters only measure cumulative volume of water and so only permit tariffs based on total volume of consumption. They do not enable tariffs to be used that vary the charge according to the time of use (e.g. seasonal peak flow, or time of day of consumption). There is therefore a need for low-cost “smarter” meters which would enable more complex tariffs to be applied and help control peak consumption at critical times.

2.3.2 There are limited water efficiency options currently available that cost-effectively save significant quantities of water. There is an urgent need for more research to find cost-efficient demand-side solutions that can make significant contributions to the supply-demand balance.

2.3.3 Water UK has established Waterwise, a new organisation jointly funded by all water companies. Acting independently, its aim is to support further demand-side actions to balance supply and demand, and promote the benefits of water efficiency to customers.

2.3.4 In addition, advances in engineering and technology have enabled water companies to reduce waste of water in three ways:

— Development of new pipe materials
— Implementation of pressure management
— Improvements in leak detection technology
In section 3 we discuss infrastructure and the prevalence of cast iron water mains. Over the last two decades the industry and its supply chain has moved to plastics for its primary pipe material, using variants of uPVC and polyethylene (PE) and electrofusion welded joints. These pipes, whilst not “leak proof” exhibit much lower leakage rates than historic materials.

2.3.5 Developments in instrumentation, control and automation and more recently wireless communication have allowed greater use of valves and remote sensors to manage pressures proactively within distribution networks, rather than allowing wide diurnal variations dependent solely on demand. Benefits of this are reductions in stress cycles and surge in pipelines leading to fewer bursts and reduced losses through smaller leaks from joints or corrosion holes.

2.3.6 Improvements in leak detection technology, again using microprocessors and wireless communications have led to new ways of identifying leakage and determining individual leak locations. Examples are leak noise correlators and acoustic loggers. These have improved the effectiveness of leak detection teams by around 35 per cent over recent years.

3. INFRASTRUCTURE

3.1 What is the current water supply and drainage infrastructure? Is there sufficient investment in its improvement?

3.1.1 The privatisation of the water industry in 1990 is now widely recognised as a success story and has led to £50 billion of investment in the 15 years since then. A substantial amount of investment has rightly been directed towards improving water quality and other environmental improvements. This is partly due to public and political pressure, both in the UK and in Europe, and the generally recognised need to clean up rivers and bathing waters from organic and industrial pollution. Sewage effluent was the Government’s first target, partly as a result of the adoption and implementation of the Urban Waste Water Treatment Directive from 1991 onwards.

3.1.2 The water industry is a capital intensive industry relying on its network of underground assets and above ground structures to deliver water supply and waste water services. The total cost of replacing all these assets today in England and Wales would be in excess of £200 billion. Three quarters of this investment is below ground and out of sight. Other essential infrastructure includes the sophisticated IT, telemetry and communication systems that control and monitor operation of treatment works, reservoir levels and pressures within the water supply networks.

3.1.3 Breaking this down into individual components, there are 325,000 km of water mains and 302,000 km of sewers. The replacement value of the underground water networks is about £43bn and the sewerage network around £115 billion. There are also around 2,500 water treatment works and 9,000 wastewater treatment works. In addition there are numerous service reservoirs (enclosed structures storing potable water) water towers and pumping stations and sewage pumping stations. The value of above ground water assets and wastewater assets is about £25 billion each.

3.1.4 Since 2000 the industry through Water UK and UKWIR, together with Ofwat, the Drinking Water Inspectorate and the Environment Agency have developed the “Common Framework for Capital maintenance” This approach was used extensively by companies to develop their asset management plans for their recent PR04 submissions. Despite continuing environmental requirements, companies will be devoting more investment to capital maintenance over the current year AMP period.

3.1.5 A high proportion of both underground networks are over 100 years old and, in London ½ of water mains are over 150 years old. Though no longer used as a material, most water mains are cast iron which inevitably corrodes over time or fractures with increasing stress (from ground movement or traffic loading). To manage leakage companies have to control pressure, to limit the stress on pipe walls and find and fix leaks where they occur. In the past with limited funding, companies have struggled but managed to achieve the Ofwat agreed targets for Economic Level of Leakage (ELL) by finding and repairing leaks combined with limited mains replacement programmes. Companies successfully reduced leakage by 1800million litres per day (Ml/d) or 36 per cent from 1995 to 2001—sufficient to supply over 12 million household customers.

3.1.6 In recent years it has become increasingly difficult for some companies to achieve the ELL and leakage has increased by 200Ml/d since 2001 (Source: Ofwat). Companies now therefore have to embark on proactive mains replacement programmes to control leakage levels. One example is Thames Water’s programme to replace over 1200km of water mains in London over the next five years. Ofwat expects this and similar mains replacement schemes and ongoing maintenance works by all companies will reduce leakage by a further 315 Ml/d over the next five years.
3.1.7 In the Final Determinations Ofwat allowed companies additional funding for tackling the distressing problem of sewer flooding. Companies will be investing almost £970 million over the next five years to resolve over 9,000 internal flooding problems and 6,000 external problems.

3.1.8 Whilst planned maintenance is greater within AMP4 the length of water mains due for replacement is only about 1.4 per cent each year and for sewers 0.4 per cent. It is questionable whether such investment levels, though greater than historic levels, are achieving a sustainable replacement rate.

3.1.9 Whilst science and technology has helped develop innovative solutions to deliver drinking water quality, environmental and bathing water quality improvements, there is a downside. These solutions rely on more advanced equipment and process control systems that have much shorter asset lives than more traditional engineering solutions. Equipment installed since the 1990s is in many cases now reaching the end of its useful life. So the maintenance requirement is increasing with the provision of new equipment.

3.1.10 In short, we do not believe there has been sufficient investment. However there are political, economic and social realities to be balanced. It is to be hoped that the effect of the Water Framework Directive, if implemented properly, will diminish the need for new areas of environmental activity and begin to tackle problems of diffuse pollution both agricultural and urban, giving full weight to the ‘polluter pays principle’. This may in turn release water companies to devote more resources and investment to improving infrastructure including wholesale asset renewal programmes where justified from sustainability criteria.

4. CONTEXT

4.1 The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at National and European levels, adequate?

4.1.1 The 2003 Water Act placed a duty of care upon water companies and Defra in respect of ensuring the efficient use of water. The Environment Agency retains the duty to ensure the proper distribution and use of water resources. Imposing the duty to conserve upon privatised water companies reinforces their requirement to take all practical measures to minimise the need for abstraction of water from the environment. In this sense the duty is properly placed on water companies. However, this responsibility should have been additionally placed on other abstractors, for example power and agricultural sectors.

4.1.2 The water regulator has recently taken on the new duty to promote sustainability. It is too early to test the extent to which this has been embraced. An issue that may need to be addressed is the approach to be taken where the most economically viable solution is not the sustainable solution. This will test Ofwat’s adherence to the new duty.

4.2 How does water figure in the development of both policy in areas such as housing, land use planning and industry?

4.2.1 Recent evidence suggests that in some instances the provision of public water supplies has not been given a high enough priority in the development of Government policy in relation to housing developments.

4.2.2 Water companies are not statutory consultees in the planning process, and so, for example, water use in new development does not seem to be fully considered as part of planning approvals. This should be addressed.

4.3 What can the UK learn from the experience of other countries?

4.3.1 The UK water industry leads the world in much of what it does. At the same time, the UK can learn from the experience of other countries with regard to managing demand through metering and tariff systems. In places like Singapore and Holland customers receive bills showing consumption profiles in charge bands, with advice as to how bills could be reduced by changing water use, habits, patterns etc. We should seek to learn from such experiences, as we inevitably move towards a society that will have to value water more highly, and pay for it on a more rational basis.

October 2005
Examination of Witnesses

Witnesses: Ms Pamela Taylor, Chief Executive, Water UK, Ms Margaret Devlin, Chairman, Water UK and Managing Director, South East Water and Mr Werner Boettcher, Member of Council, Water UK and Managing Director, Thames Water, examined.

Q53 Chairman: Could I welcome Ms Pamela Taylor, Ms Margaret Devlin and Mr Werner Boettcher who have come to give evidence to us today? There is a public information sheet available at the door, if any member of the public would like to see that, and that gives the interests of members of the Committee. I believe that amongst the people present here today in the public gallery there are scientists who are present as part of the Royal Society’s MP Scientist Pairing Scheme; we are delighted that you could join us. I wonder, Ms Taylor, whether you would like to introduce yourself and your team.

Ms Taylor: Thank you very much, My Lord Chairman, and members of the Committee. I would like to introduce Margaret Devlin, who is Chairman of Water UK and who is also Managing Director of South East Water; I would like to introduce Werner Boettcher who is Managing Director of Thames Water and is a member of Water UK’s Council. A little later in the questioning they will be representing their company interests as representatives of a water-only company and a water and sewerage undertaker respectively. My name is Pamela Taylor and I am Chief Executive of Water UK which represents the regulated water business in the UK—that is England, Wales, Scotland and Northern Ireland. May I just say that we do welcome very much this inquiry, My Lord Chairman, and the time that you and members of the Committee have devoted to this subject, because we believe that managing water resources is one of the most important issues faced by the country today, so we are very pleased to have this opportunity to attempt to answer all of your questions.

Q54 Chairman: Thank you very much. If there is nothing else of a preliminary nature that any of you would like to say, shall we go straight into the questions that we have for you? We are familiar from the written evidence and indeed from the evidence of our own eyes that over the last year or so we have had what is called an exceptional weather pattern; but we seem to have had rain recently, so has that in any way alleviated your concerns?

Ms Devlin: Certainly, the water supply outlook is normal for most regions, but it is quite serious in parts of the South East and water companies are continuing to encourage people to use water as wisely as they possibly can, particularly in view of the fact that we are having forecast a dry winter. We will need, this winter, an above average rainfall in the South and South East. We are looking for between 130 and 150 per cent, above average, by the end of March, so although, yes, it has rained, really at this stage what we are saying is we do need to see a forecast for more than we have done at present. Ms Taylor: If I may add, to put that in context, My Lord Chairman, last October we had around 130 per cent above average rainfall, but then that was followed by eight months of below average rainfall. I guess at this stage we are saying all contributions gratefully received, but we would like a little bit more in terms of resources.

Q55 Chairman: When we are looking at the national situation, I think you would agree that it varies enormously, does it not?

Mr Boettcher: Yes.

Q56 Chairman: Both the companies represented here come from the South and South East where, clearly, the problems are most acute, but would it be fair to say that in other regions, for example, the North East, Northumbria and that sort of area there would be no great concern about water supplies?

Ms Taylor: It is interesting that you do see areas of particular stress—Dundee, for example, is an area of particular stress. There are places where you have local circumstances which can lead to stress and also, of course, we cannot necessarily rely on water supply all of the time in areas which do have more rain because now we are seeing increased flooding, for example, so this causes interruptions with supply, and of course there are links between drought, flooding, agricultural policy and so on, so this is quite a big picture that we need to keep our eye on. But you are absolutely right, it is very much a mixed picture and we are seeing most of the stress in the South and South East.

Q57 Chairman: The water companies have just settled with Ofwat the last five year round. You have signed up to your funding; does that mean you are happy with the funding you have been allotted, or was it under duress that you signed up?

Ms Taylor: It is always a balance, is it not? This time around the whole process was far more transparent than it had been previously and we welcomed that very much indeed, and companies this time around were able to consult their customers in conjunction with other groups, with our regulators and with Defra and that was also to be welcomed, so we could gauge far more clearly customers’ expectations. Companies also put in draft business plans and then went on from there for discussions one to one with the economic regulator and with
their other regulators to see what would be appropriate in the end, so yes of course it is always a matter of seeing whether that has the right balance to it. Each company makes an individual decision and each company made an individual decision that it was just about right.

Mr Boettcher: If I may, My Lord Chairman, our industry has a 25 year water resource plan; what we have agreed with the regulator is outputs and resource development in the next five years, so for this period we are funded for the action we have to take.

Q58 Baroness Sharp of Guildford: That really leads on quite well to my question: how do you reconcile these different timescales between your 25 year water resources plan and then the new Framework Directive and the five year price review cycle? It must be quite difficult. In particular, does the five year price review process allow for a sustainable level of investment by the companies in infrastructure and resource development?

Ms Taylor: The swift answer is, with difficulty.

Ms Devlin: If you look at the water resources plan and the five year pricing cycle, up until now that has worked very well, but we are now entering into a situation where we will be faced with building new and big engineering schemes that we have not seen in the history of privatisation. We are looking into a phase of building reservoirs, and I guess the question there is, is the five year cycle compatible with a project that could go over 15 to 20 years? That is the first hurdle, then you weave in the Water Framework Directive and, again, we are aware that the Water Framework Directive works in six-yearly chunks and we have a five year price review, so I guess the question there is, as a minimum should those two cycles be aligned in some way? Overarching all of that is the question of funding and—I choose my words very carefully here—funding on its own is not the deliverer of the outcome. Let me explain what I mean. We may get funding for a reservoir, but that does not necessarily mean that the reservoir will come to fruition because we have other elements coming in such as planning and local authorities etc, so the price review cycle is only one element in terms of delivering our objectives. As a very minimum I think we should be looking to have the price cycle and the water framework cycle aligned, and we should use the Water Framework Directive as the methodology for doing that.

Q59 Lord Taverne: Does that mean you want a six year price review and not a five year one?

Ms Devlin: At the moment certainly Ofwat is intending to consult on the correct approach in terms of time period, but I would say as a very minimum it would have to be six years. That is my view personally.

Ms Taylor: Obviously, as Margaret says, Ofwat will be consulting on the length of the price review and what is most appropriate, and we will need to take into account that the major driver will be the Water Framework Directive. There are, of course, other drivers for change such as the house building programme in water-stressed areas and so on, so we understand that it is Ofwat’s view that the Water Framework Directive although a major player, is only one of a number of major players, so what is that appropriate timeframe going forward. If I may, it links back to a question that we were being asked earlier, which is putting the whole context of water resources into a long term and more strategic planning framework. Previously, Defra produced a document called Directing the Flow which was a very, very helpful document; we are currently in discussion with Defra about updating that so that we can understand within the framework what we are working with, because it is obvious from what we have been exploring so far that we do not own all the policies that have an impact on us, we do not own farming policy, Defra owns farming policy and the European Union owns farming policy; we do not, and we do not want to; Ofwat does not and they do not want to either. We are looking to see how much of that framework we can get with Defra, and we are very pleased to say that they are very willing to work with us, with our regulators and with other stakeholders to see if we can get that framework in place so that it can inform the kind of timeframe we will need going forward.

Q60 Baroness Sharp of Guildford: Could I ask you a little further about the price review process; how far do you feel this adequately incentivises the best and worst companies to make efficiency savings, the treatment of efficiencies within the price review framework?

Ms Taylor: Do you want to tackle efficiency?

Mr Boettcher: The regulator sets very clear efficiency targets, so if a company is not performing well, not delivering efficiencies on the operating costs, for example, or on the capital schemes we need to do, then the regulator will set a target, which he did in the last price review so he has given clear efficiency targets which all water companies need to aim to achieve, otherwise it is going to reduce their profits.

Ms Taylor: We should also point out that now that we have been through many price reviews, in terms of how much does it cost to upgrade a piece of kit, how much does it cost to bring in certain procedures and so on and how well documented they are — and as you may know all the costings that companies put in are independently audited by auditors who are employed, if you like, by our economic
regulator, Ofwat—we have got, if you like, a whole raft of shared experience as regards costings and so on. Then, as you may know, because we have an incentive-based regulatory scheme the idea is for the very best to beat Ofwat, that is the whole nature of incentive-based regulation, but if you beat Ofwat at the end of five years you hand that back to your customers, which of course you may come to later with some of your questioning, as to is that right in terms of innovation, does that help us going forward.

Ms Devlin: Also, when you look back at the history of the companies, there is no doubt that the incentive-based regulation regime has encouraged companies to move up that ladder and there is certainly a lot of bunching, particularly around performance assessments, and again during the price review the companies can get additional funding for exceptional service. Again, you will see that in this last price review a lot of companies got somewhere in that range; nobody got top marks but of course you always have to be left with something else to aspire to.

Q61 Baroness Sharp of Guildford: But by and large these incentives have actually achieved their aim of pushing you up and actually stimulating innovation.

Mr Boettcher: Yes.

Q62 Chairman: But have they universally worked and what happens when they do not work?

Ms Taylor: I think the efficiency gains that companies have made as a result of the regime that we currently have has been absolutely phenomenal, and there is no doubt at all that customers have benefited in terms of their bills either being reduced, as we saw at the last review, or held at a lower level than they might have been otherwise, so that the gains to customers have been absolutely enormous. I am not aware at all of there being any failings in terms of companies delivering their efficiency targets.

Q63 Lord Taverne: That makes it sound as if regulation is the best of all possible regulation, best of possible worlds.

Ms Taylor: It depends on the question that you are asking at the time.

Q64 Lord Taverne: How could you see it improve? What deficiencies are there in the regulatory system in the light of the many challenges you are going to have to face?

Ms Taylor: One of the things that we have done at Water UK is we have produced a consultation document on future regulation, and we employed an independent economist to talk to Defra, to our regulators and to our key stakeholders. Subsequently we have held roundtable discussions with environmental groups, customer and citizen groups and financial groups, so we are in the process at the moment of now taking written evidence from them and we will be producing a follow-up report in the New Year. There are, indeed, changes that we would like to see going forward. We think the regime has worked very well so far, particularly to the benefit of customers, but we think that going forward there are some things that you have begun to explore with us such as the timeframe with the Water Framework Directive, such as the very large issues that never were intended to be part of the incentive-based regulation regime has encouraged economic regulation but will have a major impact on us, such as urban diffuse pollution, farming policies, CAP reform and so on. These are all issues that somehow or other must be taken into account if we are to be successful going forward, and how will we deal with issues we know are coming such as the Water Framework Directive, but will not come in neat five-yearly chunks. Those are issues that we are consulting on at the moment.

Q65 Baroness Sharp of Guildford: Is that paper available on your website?

Ms Taylor: Yes, it is.

Q66 Lord Lewis of Newnham: Concerning this problem of the consultation, particularly consultation with government departments, which you have already touched on, it seems to me that you have got a close relationship with Defra but perhaps not with some of the other departments. Let us just take one example which is the one of the building programme that has been envisaged for this part of the world—this really cuts across all of your personal interests because this is where the concentration of new building is going to find itself. There is a statutory obligation, if I understand it correctly, that if a building is put up you have to provide it with water.

Ms Taylor: That is right.

Q67 Lord Lewis of Newnham: How far were you consulted then in the initial planning and what is the prospect of being consulted in the initial planning that will be made for this sort of development, because it seems to me that it could involve you with a major financial expenditure which has not necessarily been included in your five year plan?

Ms Taylor: It certainly was quite a surprise to us to see the ODPM consultation that came out and managed, if you did a word check, not to mention the word water, but from there you can only go upwards in terms of your working relationship, can you not? We have made enormous strides in that.
Q68 Lord Howie of Troon: There is an element of Voltaire about your remarks in relation to Lord Taverne’s point.

Mr Boettcher: This is clearly very much a concern for the South East because there has been, actually, very little consultation with water companies or the water industry, because we have a statutory duty to provide supply of water and the question has not really been asked, where is the water actually coming from?

Ms Taylor: Just to add to that point, whilst we have a statutory duty to supply, you will of course be aware that we are not statutory consultees in the planning process. In the past I think there has been a concern that if we are statutory consultees we will use that to stop development, but clearly that is not what we are about; simply what we are asking for is to be a statutory consultee, therefore allowing us to work with the planners to develop water in a more sustainable way going forward. That is still an action outstanding.

Q69 Lord Howie of Troon: But did you need to be asked; you must have realised this beforehand of your own intuition? You must know that if you have got to supply water then you have got to supply it, and that is more or less the end of it, is it not?

Ms Taylor: Yes.

Mr Boettcher: We do have a water resource plan that looks 25 years forward; we do have assumptions about population growth; we do have assumptions about additional demand, say a higher consumption of water per head, and we do of course understand where new development is going to be. But if we have been concerned as to how we can provide water to those areas, we have not been consulted in a more intense way.

Chairman: We might want to come back to this in a moment. Lady Platt.

Q70 Baroness Platt of Writtle: Just to continue that a minute, I come from Essex and of course there has been a great deal of complaint about the Stansted development and along the M11 corridor, that there has not really been a consideration about water and we are the driest county in England and Wales. I will go on to question 4, which is what I am here for. In the absence of real competition in the water industry, how do the companies ensure that the interests of their customers are not subsumed or dominated by those of the shareholders?

Ms Taylor: We do not actually see a conflict between our shareholders and our customer needs, they are not incompatible. Investors want to know that a water company is actually performing excellently in terms of its customers and its customer relations.

Ms Devlin: I just find the question very interesting because there was an implied comment that perhaps the shareholders’ and customers’ views would not be aligned and not necessarily compatible. In today’s world of corporate social responsibility, any company that did not look to look after its customers would actually be going down a very foolhardy route, and in terms also of investors I was quite surprised and continue to be surprised that when we go out to the market for funding, whilst they are interested in our financials, they are also very interested in how we perform against customer services, what is our record in the Ofwat league tables etc. It is a big component part of any funding that we may get as well, so to me there is no conflict of interest at all between those two.

Ms Taylor: The City is vital for the water sector’s continued success. For every £2.00 that our customers contribute in their water bills, on average, £1.00 comes from City investors. The water industry is in debt because it has to borrow heavily from the City in order to carry out the work that it needs to carry out to meet the requirements that it has.

Q71 Lord Taverne: I am just wondering whether it is in fact perhaps a little naïve to assume that there is no conflict at all between customers and shareholders. There may well be certain things which shareholders do extremely well and customers a little less well.

Ms Taylor: Not with incentive-based regulation, that should not be so, because the system of economic regulation undertaken by Ofwat ensures that companies are adequately—no more—adequately funded to carry out their statutory duties. If companies do better than that, which is the basis if you like of incentive-based regulation, then at the end of the five year period Ofwat, quite rightly, crawls through the books and a successful Thames Water needs to give that back to its customers. Either way, in theory, with incentive-based regulation the customer should be getting a good deal.

Q72 Lord Howie of Troon: I seem to remember from the distant past that at one time private water companies were limited as to what they could pay to their shareholders—I think they were limited to 3.5 per cent or something, but that may not be right. Are you limited in any way?

Mr Boettcher: The final determination in the price review determines a cost of capital which is part of the water charges we charge our customers, so the dividend that has been paid out to shareholders normally tends to float around this cost of capital.
**Q73 Lord Howie of Troon:** But at one time I believe it was capped. Is it no longer capped?

**Ms Taylor:** It is not now.

**Chairman:** That was prior to privatisation. Did you want to ask about water efficiency?

**Q74 Lord Whitty:** Yes. In terms of water efficiency by users, could you perhaps describe the efforts you are making to encourage this and is there a conflict or do we need to reconcile better demand management with your desire to sell water, particularly when you have metered water and you are actually being paid by volume? Is there a conflict there and should there be more financial incentives to industry to encourage water efficiency, along the lines of what we have in the energy industry?

**Ms Taylor:** Certainly we have, actually, a vested interest in ensuring the continued availability of our raw material, and our raw material happens to be water. What we cannot do if you like is go out there and manufacture more of the stuff in order to sell more of the stuff; on the contrary, all water companies have a statutory obligation, let alone that they have an imperative to try to ensure that people use less water, not more, because if not we will not have the water that we need to make available in order to meet the growing demands that we see. So there is no conflict, if you like, because we are not looking to sell so-called more water; the more water that we supply to people, in fact, the more it costs us to do, so it is not in our interests at all to be going down that route. Before I turn to my colleagues, if I may, about incentives and so on, 75 per cent of our customers are not metered, so whatever amount of water they use it is not reflected in what it is that they pay to water companies going forward. The important thing in the future will be that as we see more metering in stressed areas we will need to do two things: we will need to collect the evidence to ensure that metering really does have a long term impact on the amount of water that people use, not just a sharp shock, and I think the second thing we will have to do is to have smarter metering with flexible tariffs to address the social issue of people who maybe cannot afford to pay increased water charges. Those are the things that we are working on with Defra at the moment.

**Ms Devlin:** Just to add to Pamela’s comments there, there is no doubt that from my perspective metering is the fairest way of charging customers. There is a huge debate to be had around how customers then pay for that water, and Pamela has already touched on that in respect of the affordability issue, but until such time as we can get a message to customers, as we do with electricity and gas in terms of the amount that you use, the companies will always be pushing the ball up the hill in terms of demand management because there is no signal to customers in their bill in terms of taking demand management action. From my perspective, therefore, I very much welcome the water saving group that has been set up by Defra to look at the evidence-based approach to metering. We need now to move forward on that and start to get some real evidence about metering and see whether it is appropriate or not for particular parts of the country. Again, I think, like so many things that we touched on at the start, there may be a solution which is regionally specific and may not affect other parts of the country, so we may say that all of the South East has to be metered, but it may not be appropriate for the North. Those are things that we need to consider in our evidence-based approach.

**Mr Boettcher:** We need to understand if we have a higher penetration of metering how sustainable any savings really are, or is this a one year fact. We need to bear in mind the cost of putting in meters, not only in terraced properties but in flats which are on common supply so that it is very, very expensive.

**Ms Taylor:** We have just set up an independent NGO who are already questioning us and our colleagues—

**Q75 Chairman:** Is it Waterwise?

**Ms Taylor:** Waterwise. They are only a couple of weeks old; we have set up Waterwise, it has an independent board and that is already making a contribution to the debate and is indeed a member of the water savings group which Elliott Morley is chairing.

**Q76 Lord Whitty:** On that point, in the energy field we have an Energy Savings Trust and a Carbon Trust, but I understand there was some resistance in the water sector to having a similar body.

**Ms Taylor:** Yes.

**Q77 Lord Whitty:** Why do you think the Waterwise approach is better?

**Ms Taylor:** Because we felt that it should be our responsibility to put up our money, not our customers’ money, to look into whether or not an economic case can be made long term for managing demand of water successfully, and whether or not we could set up large-scale projects in consultation with our economic regulator Ofwat in order to be able to make the case. So we have set up Waterwise which self-destructs after five years; after that we will then be able to see, and our stakeholders will as well, whether or not there is then room to move on to another form of body or not. We felt that there was a lot of work that needed to be done and, rather than moaning about it or charging our customers for it, we thought we should put up the money, make it an independent NGO and send it on its way.
Q78 Lord Mitchell: I am slightly a bit of a cynic about demand management and perhaps you could give me the numbers that would help me to not have this cynicism, but when we are exhorted to reduce the amount of water that we use on a domestic basis, I sometimes wonder what the effect would be if we did cut our usage of water compared with the total demand that industry and agriculture have. I have a feeling that it may make us all feel good, but it actually does not have a big effect compared with the total usage of water; are you able to give us a feel for what the numbers are?

Ms Devlin: I am afraid we have not got the numbers to hand, but I am sure we can provide those. I think it comes back to what are the incentives for domestic customers to reduce their consumption because, as you say, you might feel good but you are not seeing anything in pounds shillings and pence. Commercial customers clearly do see a benefit from reducing their consumption—

Q79 Chairman: Could I ask you to speak a little louder because it may be difficult to get a record.

Ms Devlin: I am agreeing with Lord Mitchell that for domestic customers there is very little incentive to reduce consumption because there was no impact by and large on their bills because 75 per cent of them are not metered. For commercial customers, clearly, the incentive is there and the companies work very closely with commercial customers, carrying out water efficiency audits etc, to assist them in reducing consumption.

Q80 Lord Mitchell: Is it the same for agriculture?

Ms Taylor: In terms of agriculture there is a broader picture that needs to be addressed, and we are very pleased that Defra bring together water and agriculture. Of course we would like progress to be made more quickly, but we are working successfully with agricultural organisations and with Defra. Some of the things that we need to look at, however, take bigger picture thinking than the policies that we own, yet again; for example, if you look at, say, land use: if you drain land in order to be able to use it to plant crops, you dig channels in it to make sure that the water runs out to sea, then you deplete the soil quality so that the soil becomes like concrete, so if there is any rain it runs straight off it anyway, then you have to use irrigation methods that are more intensive in order to water the crops; this is not sustainable. These are big picture issues that we all need to get to grips with. We are not saying that these issues are not being addressed—of course we are impatient—but we will need to get to grips with them.

Q81 Lord Lewis of Newnham: May I say, My Lord Chairman, when we were looking as the Royal Commission at the purity of water many years ago—

I am talking about the eighties—one of the features that came through there was the fact that the European Union subsidy for drainage of land meant there was a situation where not only was the water coming off more rapidly and ending up in the sea, so in fact you were not getting the recovery of the water, but in addition to that it was polluting with nitrates so you were able to use a vacation factor. This is a very complicated problem, I agree with you on that, but from the point of view of the water grouping as a whole what do you see as being the really significant problems associated with this sort of interface with metering? Metering can be done at so many different levels and you were talking about smart metering a moment ago.

Ms Taylor: Yes.

Q82 Lord Lewis of Newnham: In the previous work that we did with Lady Perry as our chairman, looking at housing, we went up to Leicester and there we met people who were able to show us that by metering it over a timescale they were able to detect leakages, because all of a sudden they had lost vast amounts of water in the middle of the night when usage, presumably, was at a very low level. The word metering is very nice, but the degree of sophistication required for it and application of it does seem to me to be something that has got to be addressed in the future and, quite clearly, from an industrial point of view smart metering is a great idea, but I am not sure whether this would be true from a domestic point of view.

Mr Boettcher: We need to first understand what is the savings potential we can achieve, and I would assume that this actually differs from area to area, so in an urban area like London we will see there are a lot of flats and people have little means to really reduce their consumption. They can have water saving appliances, but the reduction of consumption is going to be less than if you have a garden and you reduce, you know, watering the lawn for example. That is something we need to understand. I do believe that at some point in time we do need to be metered because it is the fairest means to assess how much water people are actually using and they should pay for this; however, it is not just introducing a meter, we need to combine this with an intelligent tariffs in a sense, because in order to really direct consumption to basic use or maybe even prohibit excessive use as well, that is an area we need to look at. On top of that I would say that there is also a social component that we need to bear in mind: in the London area we do have some of the poorest boroughs and we need to think through if they were metered, is there a basic consumption that is subsidised maybe. This is a very complex issue that we need to look at.
Q83 Baroness Sharp of Guildford: Mine is really a short technical question which picks that up. I think I am right in saying that on every new development, dwellings have to have a water meter, so we are building in some incentive to the individuals there. 
Ms Taylor: That is right.

Q84 Baroness Sharp of Guildford: Does this apply to flats? At present this is one of the problems, where you have a block of flats it just has one delivery point. 
Mr Boettcher: If this is a new development we will have per flat in a block of flats a water meter outside, say it is eight or 10 properties. If it is a bigger block with 20, 30 or 50 flats in it we might consider building water meters in the flats.

Q85 Chairman: It would not be automatic, it depends on the scale of the development.
Mr Boettcher: It depends on the scale of the development.
Ms Taylor: It sometimes depends on how the development is managed as well in that sometimes it is possible to meter each flat individually, but the way in which whoever owns the whole development chooses to manage the development, they may choose not to do that, so there is an issue there as well, as I know in my block of flats.

Q86 Baroness Sharp of Guildford: Just to get this straight, with new developments, small flat developments, they do not have individual meters. 
Mr Boettcher: It is mandatory that new developments have meters. If that is a block of flats that has six to eight flats in it, there will be meters outside for every flat.

Q87 Baroness Sharp of Guildford: There will be one for each flat outside. 
Mr Boettcher: Yes, correct.

Q88 Baroness Sharp of Guildford: The meter can be read outside.
Mr Boettcher: Yes.

Q89 Lord Broers: My Lord Chairman, may I ask what powers are in place to enforce that? What if people just do not do it? 
Ms Devlin: In terms of?

Q90 Lord Broers: Putting in meters, for example, or using meters. Are there regulations, for example, for double-flush toilets? 
Ms Taylor: No.
Ms Devlin: There are two questions there. The first is what are the requirements for someone to put a meter in: of course, with a new development they have to come to the company for the water supply so that is the trigger in respect of having a meter installed.

Ms Taylor: The point that you make about double-flush toilets and so on is an important one in that, at the moment, there is no statutory requirement to equip new houses with water efficient devices, and what we would like is that in areas which are water-challenged we do see ODPM use powers that they do have to specify that in those particular areas we should see appliances that are sensitive to the amount of water that is used. Also, though, we have to bear in mind that it is human beings who move into houses and we have seen some absurd ideas like having kitchens with no sinks in them and things like that; obviously, people will change that and put sinks in. 
Ms Taylor: That is right. flush toilets and so on is an important one in that, at the moment, there is no statutory requirement to equip new houses with water efficient devices, and what we would like is that in areas which are water-challenged we do see ODPM use powers that they do have to specify that in those particular areas we should see appliances that are sensitive to the amount of water that is used. Also, though, we have to bear in mind that it is human beings who move into houses and we have seen some absurd ideas like having kitchens with no sinks in them and things like that; obviously, people will change that and put sinks in.

Q91 Lord Patel: Thank you very much, My Lord Chairman, I wanted to ask a question about research, but before I start that you made a comment about Dundee being the most stressed area. All I have known for the last 47 years is nothing but water falling out of the sky; why is it so stressed?
Ms Taylor: That I do not know, I wish I did, but I do know that we had—

Q92 Lord Patel: It is not my power shower anyway!
Ms Taylor: You may have cracked it for me. 
Ms Devlin: On a serious note, there is perhaps a perception that the South is dry and the North is wet, but in fact we know that in the 2003 drought a number of companies in the North did suffer with drought in specific areas, so I do not know we can be generalist and say we have a very wet north so move all the water from the North down to the dry South East, there are specific issues across the country.

Q93 Lord Patel: Now I understand, somebody has been taking the water away, it is not a shortage of it.
Ms Devlin: That is right.
Ms Taylor: The most expensive thing you can do with water is move it around.
Q94 Baroness O’Cathain: Like bottled water.
Ms Taylor: Exactly. Because its value is not very high you are looking at already an enormous infrastructure, and then the question is can customers actually be charged for putting in additional infrastructure which may or may not be used once in every 15, 17 years or whatever, so then you have to do the analysis to see whether that is cost-efficient or not. You are right, this is 1000 times more expensive than tap water, and environmentally damaging.

Q95 Baroness O’Cathain: It is actually more expensive than petrol.
Ms Taylor: Yes.

Q96 Lord Patel: I will move on to the research question I wanted to ask which is to ask you in what area does the industry carry out research, and what percentage of your budget is that? Who does the coordination of different bodies that do research such as industry, universities and other bodies, and do you approve of such organisations?
Ms Taylor: As far as one part of your question is concerned—if I may, I will ask Margaret and Werner to talk about company research—the industry itself has a research body called UKWIR—UK Water Industry Research—and that has an extensive research programme. What we attempt to do with UKWIR and with its board is to look ahead at the challenges we may be facing and then say where do we need research? For example, you were asking us earlier about the Water Framework Directive and so we have been looking at possible costs of implementing the Water Framework Directive. Additional work needs to be done on who are the most appropriate people to pick up the cost—and it is always tempting to say it is the water customer because they are always there. In addition to work such as looking ahead in that way we also look ahead in terms of climate change. We are doing research on climate change, we are doing research on water resources, waste water, sludge to land—customer use as well we will look at and customer perceptions. The projects are very broad-ranging and UKWIR works with Defra, with other government departments and, crucially, with our regulators. A research project will therefore be a joint project so that the regulators are confident about the way in which the research project has been set up, so they recognise they can have confidence in the outcome. That is the only part I can talk about in terms of the water-wide work, but then I know that individual companies themselves carry out research too.
Mr Boettcher: Companies do support UKWIR as well. Clearly, companies do have—I talk now of Thames Water—research and development departments that are more focused on how can we improve operational issues so how can we improve, say, the speed at which we can repair leakage, how can we improve a better flow in the sewage treatment plants. Thames Water, for example, has roughly 18 people—I cannot now give you the number for how much that is in turnover, so we would need to look at this.

Q97 Lord Patel: Are you able to give that figure as a percentage of the turnover?
Ms Taylor: If we may, we will come back with that.

Q98 Lord Lewis of Newnham: If we take climate change, for instance, the South East is the area which is going to be under most stress; we are going to get high temperatures and we are going to get less water being produced as far as the country as a whole is concerned. The CO₂ content at the moment is quite clear, because no matter what happens until 2040 we know what the statistics are going to be from the IPCC. How far have you actually brought this into account in allowing for your research into the needs that are going to be there? Another thing would be the Thames Barrier and things of this particular nature, which of course is now being exceeded on a more than regular basis as it were with the implementation of a possible new replacement for this. How far are you involved in this sort of discussion?
Ms Taylor: We work with UKCIP who are funded by government and we build into our water resource planning and into the proposals we put to our economic regulator each five years the latest information that we have on climate change. UKWIR is also very much involved in taking that information and looking specifically at how it might apply to the water industry. Interestingly, one of the things as a result of that is, yes, it will have an impact of course in terms of the drier areas in terms of drought, but if you are looking at issues to do with flooding and so on then it will have an impact in the North as well. Flood contaminates raw water quality, increases the cost of cleaning up the water and putting it into supply for our customers, so that again has an impact on the industry and therefore on our customers as well. Climate change is a very complex issue, therefore, and one thing that does not require any research really to work out is that sewerage treatment works and sewerage pipes and so on work very much better when they are not under water. So there are many issues here that we do need to address.

Q99 Lord Taverne: Can I be reassured on the timing of your research plans, that you are looking at the impacts of possible alternative scenarios? Presumably you are not duplicating work that has already been done by the Hadley Centre or the Tyndall Centre and trying to second-guess the International Panel on Climate Change?


**Ms Taylor:** No, what we do is that we take the expertise that there is, we ask those experts to work with us and then we ask them to help us to focus on what the questions are that we need to understand the answers to.

**Chairman:** Lord Mitchell.

**Q100 Lord Mitchell:** Thank you, My Lord Chairman, I would like to ask a question about reservoirs and the construction of new reservoirs that you are proposing around the country. What steps are you taking to assess the social and environmental impact of such projects? Secondly, are there viable alternatives that could be used to secure additional supply?

**Ms Taylor:** If I may in a moment ask Werner and particularly Margaret to address that, in terms of the social and environmental issues relating to reservoirs, that is really the first thing that you have to consider when you are putting forward any proposals for any project, however small, let alone a project as large as a reservoir. It would not come into the minds of a water operator to consider any kind of project, however small or however large, without having to make a case regarding the social and environmental effect. A social and environmental impact assessment has to be carried out rigorously and will be tested over many years. For example, if you were looking at the length of time, perhaps, that it takes between planning, and producing a reservoir, you are looking at up to 20 years, so certainly the social and environmental implications will be assessed. I think it is also fair to say that subsequently reservoirs become SSSIs, which is Sites of Special Scientific Interest, in their own right, they become nature reserves, and sometimes it is possible to forget the reservoirs are there for storing water so that we can supply customers but also, crucially, so that we can keep river levels topped up and so on, so reservoirs actually do provide a service for the environment, and it is not just a question of supplying drinking water to our customers.

**Ms Devlin:** Perhaps if I can add on that, in terms of the water resources plans, we have already talked about the fact that these plans are put together over a 25-year period, and they look at the least-cost option over a five-year and 25-year period, so it is a question of what will cost least in terms of the environment, in terms of economics, and in terms of society. So it is not just simply saying what is the easiest option for companies, it is what is the least-cost option, and that is continually evaluated. Our water resources plans are updated each year and then as part of the price review process they are fully updated to take it back out for another 25 years. I would just endorse what Pamela says, we do not see reservoirs as the easy answer. We see them as very much being part of the twin-track approach, looking at tackling leakage, tackling management, tackling metering. We also have to remember in the South East we are short of water and we have to develop new resources. Leakage on its own will not do it and metering on its own will not do it. All combined together I think we will have the solution to it and that is in our water resources plans. Again, it is not an easy option, and speaking as someone who has two reservoirs, one of which is a nature reserve and the other which is an SSSI site, I can tell you that they are packed almost every day of the week with people sailing on them, walking round them, bird watching, local schools coming to visit. So they do put back into society a very welcome contribution.

**Q101 Lord Howie of Troon:** I am very relieved to hear that. I am a civil engineer and I like building reservoirs or almost anything! Incidentally, the Thames Barrier is alright. I was involved in the design of it and it will last 100 years. All I can say is despite the reassuring remarks we have just heard, when we look at this table on supply and demand in the response from Water UK, in paragraph 2.1, giving the options for increasing water supply, I notice that when the options are new reservoirs and dam raising you have got “for” and “against” in two columns but your environmental concerns are in the “against” bit. What you have been saying are positive remarks about environmental concerns so I think you should maybe shift them from the “against” to the “for”.

**Ms Taylor:** I am sorry if we gave that impression. If I may in a moment ask Werner and hear that. I am a civil engineer and I like building particularly Margaret to address ... and dam raising make a case regarding the social and environmental you have got “for” and “against” in two columns but your environmental concerns are in the “against” bit. What you have been saying are positive remarks about environmental concerns so I think you should maybe shift them from the “against” to the “for”.

**Lord Howie of Troon:** Of course you do.

**Ms Taylor:** We will always do that and obviously others will then look at our proposals and society will make a judgment as to whether or not the impact on the environment is adverse or too adverse and it will not be right to go ahead, in which case permission would not be given.

**Lord Howie of Troon:** Show them the picture of the Boulder Dam in Lake Reid, that should convert them.

**Q102 Lord Howie of Troon:** Of course you do.

**Ms Taylor:** We will always do that and obviously others will then look at our proposals and society will make a judgment as to whether or not the impact on the environment is adverse or too adverse and it will not be right to go ahead, in which case permission would not be given.

**Lord Howie of Troon:** Show them the picture of the Boulder Dam in Lake Reid, that should convert them.

**Q103 Chairman:** But it is true, the last very large dam that was built, the Kielder Dam in Northumberland, with hindsight was probably not a sensible investment. Is that correct?

**Ms Devlin:** I suppose if I sit here today looking at my reservoir levels of about 40 per cent, I would very much like to have Kielder Reservoir in the South East. I do not mean to be flippant but I think longer term that investment may well be justified.

**Q104 Chairman:** If you look at the social benefits and you did that exercise all over again, you would not come to a decision to build it.
Ms Taylor: I think, my Lord Chairman, it is very fair to say, as you were saying earlier, that since we have been subject to economic regulation, which is very stringent, the way in which we carry out our social and environmental impact assessment has improved beyond measure and the way in which we evaluate has improved no end, too. I guess it would be fair to say that many Victorians would have said about their infrastructure they developed for London, “My goodness me, we have over-engineered this,” but you are grateful for that now.

Chairman: I think we must move on. I am sorry that we are taking a little longer than we anticipated. Lady Perry?

Q105 Baroness Perry of Southwark: I wanted to go back to the ODPM Sustainable Communities Plan. You have already said that you were not consulted and you rather wished you had been. In particular, I think you made it clear that it provided a great new feature for your 25-year plan, so you obviously had to re-think that. Are there going to be difficulties cost-wise in what you are going to have to charge for providing this extra water? Is it going to affect the costs?

Mr Boettcher: In principle, if I may answer this, if we need to develop a new resource to supply water to a new development, that means additional cost.

Q106 Baroness Perry of Southwark: Of course.

Mr Boettcher:—which will be through Ofwat, our Regulator, reflected in water charges.

Q107 Baroness Perry of Southwark: Is that going to have an impact on what you have to charge consumers?

Mr Boettcher: Yes, it will have an impact on what we have to charge.

Ms Taylor: And that is one of the points we were making earlier about large-scale investment and the appropriate mechanisms to look at these and to look at them over a long term and to plan for them and to bring them in in the most cost-effective way.

Q108 Lord Taverne: I want to ask some questions about regulation and start with one particular one; are environmental standards now too high?

Ms Taylor: Well, let’s say that at one time before any of us was involved of course, the United Kingdom was known as the “dirty man of Europe”, and that was not a tag that any of us wanted, and certainly does not apply now. I think that when it comes to environmental standards, if you just look at them in isolation that is to miss the point. The point is to think of improvement to the environment and therefore its impact on society—for example, urban regeneration—and I think then if you look at environment in terms of a broader picture, the picture to do with sustainability, which would be society, environment and the economy—

Q109 Lord Taverne: I hate the word “sustainability”.

Ms Taylor: I am so sorry.

Q110 Lord Taverne: It is seldom defined and much overused.

Ms Taylor: I was trying to give you the three legs of it. I think if you do look at it in terms of those three legs then you have a judgment to make. If you look, for example, at the Water Framework Directive which is talking about the quality of raw water, which is, if you like, our raw product, then you have to say that, yes, it does make sense to be allowed to make sure that your raw product is cleaner so that customers are not forever paying the bill at the end in order to clean up what society is doing to its water. Again, interestingly even within the Water Framework Directive you will be allowed to argue that point if it is going to be economically unsound, and we believe that is a sensible safeguard.

Q111 Chairman: Just following up Lord Taverne’s point, the Water Framework Directive will have a daughter Directive, for priority substances, a draft of which is in consultation at the moment, which appears to be highly prescriptive about what can and cannot be passed through the water supply, nickel and other products like that. Does this concern you or do you feel that these are environmental standards which are logical?

Ms Taylor: We are in favour of environmental standards, as I say, when they are not looked at in isolation and do take into account social and economic aspects. What we attempt to do in working through Defra, through UKREP and DG Environment in particular is to make sure that DG Environment is aware of the impact on water customers’ bills. In the UK we have far more transparency with customers’ bills than in most other European countries, so they are made aware of this. The best example perhaps I can give of that is that the European Commission was proposing, for example, to bring in a revised Bathing Waters Directive and the time-frame was such that it was due to kick in ahead of the benefits from the Water Framework Directive. That was madness because that meant that we would be investing money knowing that we would not be able to achieve improved bathing water quality because the run-off from the land would be polluting the water, so you had to make sure that the run-off from the land was dealt with first through the Water Framework Directive before kicking in the Bathing Water Directive. That is the kind of thing we look at in consultation with DG Environment and we give them direct figures in terms of the costs there
might be on the water industry. If I may just add that is one huge benefit of being a very highly regulated and very efficiently regulated industry. This may be a pain sometimes but it does mean that we are able to provide European lawmakers with very, very good information about the impact on our customers of what is they are proposing.

Lord Lewis of Newnham: But we are being governed very much by European law—

Chairman: Just a moment, Lord Taverne wants to come back.

Q112 Lord Taverne: I think it is a very big subject but I will not go into it any further. Another question about regulation is whether the focus on the environment and the interests of consumers are compatible with the long-term benefits of the system, the long-term development of the system. What may be most attractive economically in the short term may not provide adequately for the long term. Do you see a conflict there in the present regulatory framework or particular regulations?

Ms Taylor: I think that we will see an improvement in that now that Ofwat has been given a new statutory duty to look at the issue of, I am so sorry but it is sustainability, I cannot help that. What we are doing with Ofwat is tracking back in some circumstances to see whether if they had had that duty earlier, it would have made a difference to what happened, and also attempting to look ahead with them as to what that new duty will mean. This is very early days because Ofwat knew that they were going to be receiving this duty because of the Water Act but they did not know that Defra was going to be kind enough to give it to them a year earlier than they had planned. So Ofwat are now working on that and they are going to be working in consultation with us. So the point that you raise is certainly one of the points that we will need to explore with them.

Q113 Lord Howie of Troon: In the Water UK submission, you remark that there is little direct water reuse. Assuming that is a bad thing, what are you doing about it?

Ms Taylor: Well, we are talking to the European Commission about this because water reuse is one of the areas where pretty little attention has been given to it, but I think it perhaps depends on what we mean by water reuse, and it does mean different things to different people. Sometimes people use the term meaning collecting water and using it, say, grey water, and so on. Sometimes people mean you can have different qualities of water supplied, for example, to one household. Sometimes we are actually talking about recharging the natural aquifers, if you like, artificially with water. All of those are issues that need to be looked at and need to be looked at carefully. We have certainly worked through our pan-European organisation to look at those issues and to engage the World Health Organisation on that and to engage DG Environment as well.

Q114 Lord Howie of Troon: Apart from looking at it, have you actually done anything?

Ms Taylor: It is quite hard for us to do anything other than to stop people letting us do things. The European Commission, for example, was not keen on the idea of our being allowed to recharge the aquifers artificially. We managed to stop them having that as a good idea. In a way sometimes our achievements are stopping people stopping us doing things.

Q115 Lord Broers: We are on European matters now perhaps and as an industry, and perhaps you are not alone in this, you sometimes seem to be playing catch-up with the latest European Directives which dictate how you deliver the business. Do you think this is a fair assessment?

Ms Taylor: No. Water UK is only seven and a bit years old so I think it is fair to say there are some European Directives obviously that became law before we were invented, so if we are complaining or struggling in any way (which we have not done, we have not complained) I think it would be wrong of us to do that because we have a responsibility to be a good and active player in the European stage, and I think we have a responsibility and no excuse not to go to the lawmakers and various DGs in Brussels and to make our case forcefully, which we do. As I was explaining earlier, because we have such excellent data because we are so highly regulated, we do have a major impact. I think, though, what it is fair to say is that what we need to encourage DG Environment and DG Competition and others to do is to be more practical in terms of looking forward to think through the implications of what they are doing, and in particular to think through who is going to pick up the bill for this and when are they expected to pick it up, because too often it is our customers because they are not joining up their strategies successfully enough in terms of DG Agriculture talking to DG Environment. Trying to bring them together is something of a challenge sometimes but it has to be done, so rather than complain or moan to our Government about it we have set up an office in Brussels and we are getting on with it.

Ms Devlin: If I may just add, that was with the full support of the whole industry because we fully recognise what has happened to the industry, with a lot of that is coming from Brussels, and there is no point in crying at the end and saying we did not know anything about it; we have to be in there influencing, so we fully support Pamela’s team.
Q116 Lord Broers: One example was compliance with the Urban Waste Water Treatment Directive where we achieved this but by using large structural solutions with massive energy needs?
Ms Taylor: Yes, that is something where I am now talking to DG Environment about climate change and they have actually asked us to help them with some work that would have European-wide implications because we are looking at both mitigation and adaptation and we are also looking at them not bringing in measures that will make the situation worse, incineration and so on. DG Environment and other lawmakers in Brussels have got to grasp that everything they do will have an impact on climate change, therefore what is that impact, how are we going to assess it, and what is the most sensible way forward?

Q117 Chairman: May I ask the question again I asked before about the priority substances Directive. Are you satisfied that this Directive is going to help you or do you think it is going to be another bill for which you are going to have to commit heavy capital expenditure?
Ms Taylor: We are concerned that if it is implemented in some of the ways that are being suggested at the moment that we will have to pick up the bill unnecessarily. What we are looking at is where are the appropriate interventions, who is it appropriate to pick up elements of the bill and how should we do that going forward, a little like when we talk about urban diffuse pollution. At the moment it is very simple to say, “It all runs off here, who is at the end of it? The water operator is. Who picks up the bill? The water operator’s customers. It has always been easy. That is the way we have done it. Let’s go on doing it.” We cannot afford to do that any more.

Q118 Lord Lewis of Newnham: May I just say how delighted I am that you are getting in there at the beginning. After all, something like 80 per cent of our environmental regulation is issued from the European Union and, in fact, what is very difficult once a Directive has been decided on is to get it changed. People are prepared to listen at the beginning but not at the end of the argument, as it were, so I am more than delighted at that. I look back at the Nitrates Directive, which strikes me as being a rather ridiculous application, which is now effective and in principle could cost a lot of money in this country to implement if we ever have to go along that particularly line, whereas if there had been sufficient discussions at the early stages I think it would have been different. How far now are we still working on end of pipe analysis rather than analysis for receipt of water and use of water?

Ms Taylor: Too much. The Water Framework Directive is a tool to help prevent that, but only if people embrace the Water Framework Directive as enthusiastically as we have. We have been disappointed that too many organisations who ought to be playing a major part in the Water Framework Directive are too far behind the pace in England and Wales. In Scotland we are seeing better strides being made. I think there is also a feeling that the Water Framework Directive brings problems. It does not; the problems are already there. What the Water Framework Directive does, if you like, is provide the tools for addressing those problems and addressing those issues. There is no doubt that the slower we are to implement the Water Framework Directive, the more we will be dependent on end of pipe solutions, the more that will cost society, the more it will cost our customers, and the less successful we will be because they are not sustainable options and they probably will not even deliver what is required under the Water Framework Directive in any case.

Q119 Lord Whitty: Can I take you back to agriculture for a moment. I spent four years as Agriculture Minister trying to avoid being seen as the NFU’s nark—
Ms Devlin: I think you succeeded.

Q120 Lord Whitty: There is a real issue here where we have got consecutive Directives imposing themselves on individual farmers. Obviously it is correct that agriculture is now the biggest individual polluter of water because of the diffuse nature of the effects, but it is not obvious to me that the answer to that is to put the responsibility and the cost on the individual farmer. The management of catchment areas is important and it is not clear that if you have some of the individual farmers all trying to obey very prescriptive regulations, sometimes contradictory, that is going to get you the best use and the best management and the best water out of that particular catchment area. What is the water industry’s view of that or the Environment Agency’s view of that because it is a big cost on agriculture and it does not seem a necessary and most cost-effective way of doing it.

Ms Taylor: We agree with you. We think it is very important that the bill for anything such as diffuse pollution, or whatever it may be, should be picked up in the best place in terms of society, in terms of who is most appropriate to pick up that bill. So what we want to avoid is a centralised answer. What we need, if I may, is what you have just mentioned, which is catchment management, so if within a catchment you can define the catchment and if you can define the issues that need to be addressed, then all the catchment players, if you like, should be responsible for saying what is the most appropriate solution.
may be that in certain areas how farming is currently being carried out is not a major contributor to the problem. It may well be that there is a particular industry or inappropriate building of housing. I do not know, but there are differences within catchments, and so always to say that just because farming is the biggest polluter (which it is) that therefore farmers need to be penalised is not the way forward. Farmers have a major role to play in terms of our society, in terms of managing land in the countryside and so on, and it is for us to work in partnership with them as regard solutions and not to impose inappropriate solutions centrally. This is something that I know if you were to ask the NFU they would tell you that we are working very successfully with them on.

Mr Boettcher: Just to endorse this. We need to work as a water industry in partnership with farmers as well because there are a lot of things. This is about education as well and the water industry and farmers need to really understand what the results are.

Ms Taylor: We, for example, have been putting money into helping farmers in terms of their use of pesticides. If farmers can be helped to use pesticides more wisely and save themselves money, they are not going to mind that in the slightest. So it is for us to share the knowledge and experience that we have and to form sensible partnerships.

Ms Devlin: If I may also add from the industry perspective, the other area that we are concerned about, whilst acknowledging concerns about the agricultural sector, is that clearly what we cannot have is a continual escalator of customer bills. That brings issues for the industry in terms of affordability and bad debt. We have to work very carefully to work out where is the most appropriate place for the cost of these things to be allocated, but certainly it should not just be an easy option; put it on to water customer bills.

Chairman: We have taken rather longer than I anticipated and I apologise to my colleagues for having misled them in that respect. Could I thank Ms Taylor for the evidence you have given us. I know your colleagues, Ms Devlin and Mr Boettcher, are going to stay on and be joined by their colleagues, but thank you for appearing on behalf of Water UK.

Supplementary evidence from Water UK

PERCENTAGE OF WATER COMPANY TURNOVER SPENT ON R&D FOR 2004–05 (AS PUBLISHED IN OFWAT FPE REPORT (SEP 2005)—TABLE 4)

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December 2005

Memorandum by South East Water

South East Water welcomes the opportunity to submit evidence to the House of Lords Select Committee on Science and Technology’s Sub-Committee on Water Management. The words of the Chairman as expressed in the formal call for evidence are particularly apt in consideration of the drought conditions currently being experienced across the south east of England.
South East Water supplies a population of 1.4 million people with approximately 400 million litres of water each day across two geographically separate supply areas in the south east of England. Clearly it is essential to maintain a secure water supply to this population and to the many businesses that rely on a secure wholesome supply for their business needs and we welcome the interest of the House on the subject of water management.

A number of questions are set out in the call for evidence and we address these in turn below.

Q1: What are the causes of the current problems of water supply, and how serious are they?

Water companies calculate a supply demand balance based on all but “exceptional” circumstances where “exceptional” is considered to be weather patterns with a return period of less than one in 10 years. This is consistent with the Environment Agency reference level. Water companies prepare Drought Plans which are geared to make greater use of existing supplies by managing demand when exceptional circumstances arise. Drought Plans provide an indication as to when a company may implement hosepipe restrictions and apply for drought permits or orders, which allow the taking of additional water from rivers which may impact on the Environment. These plans are currently reviewed and approved by the Environment Agency and the next round of plans will be statutory.

This balance between supply and demand is based upon a historical assessment of the performance of existing sources. The problem with this is that we appear to be living in an increasingly uncertain climate and the levels of service planned for, by looking back over time are not necessarily the levels of service delivered going forward.

In the winter of 2004–05 the south east of England received only 50–55 per cent of the long term average rainfall and this meant that groundwater supplies were significantly below normal levels at the start of the summer period. In addition the low winter rainfall has resulted in some surface water storage reservoirs not refilling during the winter months.

Whilst the summer of 2005 was not a high demand period we consider that this is largely because of climatic conditions rather than the media campaigns and hosepipe restrictions which have been implemented across the south east of England. Although it is difficult to assess the demand savings from hosepipe restrictions because of the varying weather patterns, early analysis suggests that savings equate to only 1 per cent of demand, thus not making a significant contribution to demand management.

One possible explanation for this is that the current legislation, which provides for hosepipe restrictions dates from the 1940s and specifically allows for companies to restrict customers from watering private gardens or washing private motor cars. Discretionary use in the home has changed significantly since this legislation was passed and an increasing proportion of the peak summer demand is driven by filling inflatable paddling pools and other water consuming recreational garden equipment such as water slides and ponds.

South East Water is currently in discussions with the Environment Agency regarding the need for Drought Permits which will help preserve surface water supplies across the Sussex and Kent area of supply. Although normal winter rainfall will see surface water recharged, a repeat of the 1921 or 1933 winters, which had very low rainfall, could see Ardingly and Arlington Reservoirs empty in early January unless further interventions such as drought permits are implemented.

Groundwater sources which provide approximately 75 per cent of supplies for the company are generally currently well below normal levels but the yield from these sources is within the company’s supply demand balance planning assumptions. We need approximately 125 per cent of rainfall over the next six months to enable groundwater resources to be recharged back to average levels in time for the summer demands of 2006.

Q2: What are the projections for future water supply, and what factors will influence these projections? Where, and over what timescales, may problems emerge?

South East Water’s water resources plan details a forecast of increasing demand from existing customers and from new customers. Approximately half of the forecast increase in demand is driven by existing customers using more water.

New supplies are required to meet this forecast increase in demand and for South East Water our water resources plan includes a desalination plant on the south coast, a new reservoir and additional groundwater development. There are a number of resource developments required in the south east and these are identified in the draft South East Plan, the regional spatial strategy for the south east of England. Water companies and the Environment Agency have worked together to ensure that these schemes are appropriately represented in the draft plan.
15 November 2005

All of these projects have major expenditure associated with them and some will require a public inquiry. The long lead time required to construct a new reservoir means that the planning process can be particularly uncertain and the basic drivers for the scheme may require revision and update several times before the scheme reaches the final planning approval stage.

New resource development is typically controversial and it is important to maintain an open dialogue with all stakeholders so that the company can effectively communicate the need for the scheme and listen to the views of interested parties so that the best specific solution can be found.

Q3: Is sufficient research being devoted to predicting, and handling, possible future scenarios?

Through industry research bodies such as UK Water Industry Research (UKWIR) and its links with UK Climate Impact Programme (UKCIP), the Hadley Centre and various academic research departments, the water industry is ahead of the game compared to other sectors when it comes to evaluating the effects of climate change. This allowed water companies to incorporate climate change within their latest Water Resources Plans and research continues that will improve predictions to inform the new statutory Water Resources Management Plans due in 2007–08.

However, due to the water industry funding mechanism of RPI+K the ever increasing drive for efficiency has meant that many companies research and development budgets have all but disappeared. We consider that this type of regulation is beginning to restrict the innovation of water companies in developing new ways to deal with these future scenarios and this view was also made by Lord Sainsbury at a Water UK/DTI conference in May 2005.

Q4: Is the response of Government, the EU, regulators and the industry adequate?

South East Water has worked closely with stakeholders in the development of its most recent water resources plan. We have worked to understand the likely outcomes of changes to the regional planning frameworks which drive significant uncertainty in our forecast of demand for water.

In addition to offering customers free meters, South East Water has included a selective metering programme, which targets sprinkler users, to increase the proportion of metered customers in the longer term. A high proportion of metered customers opens up new options for demand management. Leakage has been reduced by 30Ml/d in the last five years and this has provided an important contribution to our supply demand balance. Leakage is now being held at a defined economic level, where it would be more expensive to reduce leakage further than to build new resources, and new resources are now required to maintain the balance between supply and demand.

The Office of the Deputy Prime Minister has provided forecasts of additional housing requirements in the south east with the aim of making housing more affordable. However, water companies need a better understanding of the movements in population both regionally within the UK and immigration forecasts so that demand forecasts can be more robust.

We welcome the continued sponsorship of UKCIP by Defra given that climate change is one of the most significant threats to the long term security of water resources. It is important to bear in mind that the balance between supply and demand is largely based upon what has been observed in previous years so this means that there is always a risk that supplies will not meet demand and we need to understand the uncertainty going forward and to make appropriate allowances for it.

Q5: What are the options for increasing water supply, and what are the arguments for and against?

There are a variety of options to increase water resource availability, however the application of them depends on the nature of the problem (i.e. to meet short term peaks in demand or long term average demands). The table below lists these options together with the advantages and disadvantages of each option.

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**15 November 2005**

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<tbody>
<tr>
<td><strong>Dam raising</strong></td>
<td>Low operating costs</td>
<td>Yield may not necessarily increase</td>
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<tr>
<td></td>
<td></td>
<td>Further land loss</td>
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<tr>
<td><strong>Pumped storage</strong></td>
<td>Relatively low capital cost</td>
<td>High operating costs</td>
</tr>
<tr>
<td></td>
<td>Better use of existing storage</td>
<td>Not all reservoirs are suitable</td>
</tr>
<tr>
<td></td>
<td>Low environmental impact</td>
<td></td>
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<tr>
<td><strong>River intakes</strong></td>
<td>Little or no summer yield</td>
<td>Poor water quality</td>
</tr>
<tr>
<td></td>
<td>Low capital costs</td>
<td>May have environmental concerns</td>
</tr>
<tr>
<td><strong>Licence changes</strong></td>
<td>Virtually no costs</td>
<td>Environmental concerns</td>
</tr>
<tr>
<td><strong>Boreholes</strong></td>
<td>Usually good quality water</td>
<td>Not all areas suitable geologically</td>
</tr>
<tr>
<td></td>
<td>Incremental developments possible</td>
<td>Limited availability</td>
</tr>
<tr>
<td></td>
<td>Low environmental impact</td>
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<td></td>
<td>Relatively low capital costs</td>
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<td></td>
<td>Relatively low operating costs</td>
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<tr>
<td><strong>Aquifer recharge</strong></td>
<td>Relatively low capital costs</td>
<td>Not all geology suitable</td>
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<tr>
<td></td>
<td></td>
<td>Mixed results from trials</td>
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<tr>
<td></td>
<td></td>
<td>Risk to existing groundwater supplies</td>
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<tr>
<td><strong>Conjunctive use</strong></td>
<td>Effective use of existing system</td>
<td>Complexity of operation</td>
</tr>
<tr>
<td></td>
<td>Low environmental impact</td>
<td>Water transfer costs high</td>
</tr>
<tr>
<td><strong>Bulk transfers</strong></td>
<td>Effective use of resources</td>
<td>Adjacent areas may not have surplus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reliability of supplies for donor company</td>
</tr>
<tr>
<td><strong>Water grid</strong></td>
<td>Evens out surplus/deficit areas</td>
<td>High operating costs</td>
</tr>
<tr>
<td></td>
<td>Low environmental impact</td>
<td>High capital costs</td>
</tr>
<tr>
<td><strong>Desalination</strong></td>
<td>Reliable and unlimited yield</td>
<td>High operating costs</td>
</tr>
<tr>
<td></td>
<td>Relatively low capital costs</td>
<td>Specific for peak demands</td>
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<tr>
<td></td>
<td></td>
<td>Debatable environmental value</td>
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In the course of producing our Water Resources Plan, the Company investigated 142 ‘unconstrained’ resource development options, including all of the above examples. For all of these options the proximity of the resource option to the area of demand has to be considered as transferring water over long distances drives high operational costs.

Desalination has been shown to be particularly suitable in South East Water’s area of supply because of the connectivity to key infrastructure and because of the nature of its use. The desalination plant, funded in price limits, due to be constructed over the next 2 years, will typically be used only in dry years when demands are high and when more traditional resources are depleted. For the foreseeable future desalination will only be economic when used in this respect. On balance, the lower capital costs more than offset the occasional high operating costs, making desalination the cheapest solution to the current problem. The use of desalination to provide output on a normal daily basis would make the overall cost prohibitive and therefore South East Water has included in its longer term plan a new reservoir to provide for growing base (normal year) demands.

Q6: *What are the likely future trends in water demand, and what can be done to manage demand more effectively, and to influence the behaviour of consumers and others?*

South East Water predicts an overall continued increase in demand to 2030, primarily due to new domestic demand and increased usage per person. Per capita consumption in both measured and unmeasured household properties has been increasing steadily and an underlying growth rate of 0.3 per cent per annum is expected over the planning horizon.
Water companies are having an increasingly detailed understanding of water usage patterns. This has now reached the 'micro-component level', with detailed logging of individual properties and analysis of individual appliance usage.

In order to effectively achieve water efficiency savings from customers and others a co-ordinated approach is required. Companies have implemented a wealth of education programmes particularly in the schools to encourage the younger generation to be aware of the value of water and to respect it as a scarce resource.

South East Water considers that metering is an essential pre-requisite to achieving water efficiency savings. However, we are concerned that the opportunities available to companies to compulsarily meter customers are limited and as such the implementation of more innovative tariffs that could aid water efficiency is being delayed. The reinstatement of compulsory metering for all customers could aid the implementation of innovative tariffs for domestic customers and therefore allow companies to incentivise customers to save more water.

Q7: What contribution can science, engineering and technology make towards reducing water use or waste by households, businesses and the public sector?

Scientific research and technological development continues to make important advances in methods and devices to reduce water use. It is our experience that it is not necessarily a lack of innovation but a lack of efficient delivery mechanisms that limits their effectiveness.

We consider that technology is available to reduce demand. For example high technology meters that can measure consumption diurnally can enable companies to make charges reflective of peak daily demands. New technology is currently used to make leakage detection more efficient and hence reduce overall levels of leakage.

RPI + K regulation of the industry can act as a disincentive for the use of more expensive new technology, and thus the manufacture of the technology although proven, remains on a small scale and highly priced. The regulatory mechanism needs to take account of new technology and allow companies to develop these initiatives to deliver more sustainable water savings in the longer term.

Q8: What is the current state of the water supply and drainage infrastructure? Is there sufficient investment in its improvement?

Since privatisation the state of the water supply structure in some areas has improved significantly. South East Water has replaced, rehabilitated and re-laid over 1000 km of pipes within its supply area since privatisation. The introduction of a new common framework approach to maintain the condition of water company assets has led to a better understanding of the performance of the network and improved targeted investment to ensure that all customers receive a similar level of service. The findings of the study have, however, identified the need for continued increased investment over a number of years and it is important that funding is provided to maintain this investment going forward.

Q9: The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at national and European levels, adequate?

Increasingly it seems the 5 year Price Review cycle is out of step with other key regulatory cycles such as the Water Framework Directive and land use planning timescales. The result of this can be uncertainty, inefficiency and inadequate funding to undertake environmental improvements or to integrate water resources planning effectively into a wider planning framework.

Additionally, better co-ordination between regulators is required. Water companies are often found in the centre of differences of opinion between economic and quality/environmental regulators. This has led to situations, particularly in the area of demand management and environmental protection, where the Environment Agency expects outputs beyond that allowed within price limits set by Ofwat. There is a need for regulators to recognise that water companies are commercial organisations and therefore have strict financial rules in order to provide an efficient service and maintain a viable business.

At the PR09 review of water company prices, the Water Framework Directive has the potential to be one of the most significant price drivers. Effective implementation of the polluter pays principal will provide appropriate incentives to reduce pollution events.
Q10: *How does water figure in the development of Government policy in areas such as housing, land use planning and industry?*

Until recently, water companies and water infrastructure appears to have had a very low profile in housing provision and land use planning. We have not traditionally been consultees in the planning process and therefore water has not been fully taken into account when considering development planning.

Better co-ordination between water resource management and development planning is essential and to this end we welcome the moves to make water companies statutory consultees under the development planning framework.

Q11: *What can the UK learn from the experience of other countries?*

Although the UK is often praised in the context of its regulatory structure and successful privatisation policy, there are examples to follow from other countries on specific aspects of water management. We remain behind the game with regards to water metering and metering technology. Also lessons can be learnt in relation to water efficiency from countries with whom links can easily be forged.

Improving customer ‘buy-in’ and awareness of water resources issues to try to bring about behavioural change is one aspect that the UK should look to rediscover, taking note of overseas experience.

The Environment Agency’s Demand Management Bulletin regularly showcases water saving techniques and policies used abroad. With water we cannot afford to assume that savings will be delivered so we need new trails that can provide a base of reliable evidence that is undisputed on which we can complete our resource planning process.

South East Water is supportive of a legislative framework that is aimed at engaging stakeholders and developing transparent and understandable methodologies. We look forward to working constructively with Defra, the Environment Agency, Ofwat and the industry/stakeholder groups to ensure that forthcoming environmental regulation is implemented in an effective and joined-up manner.

*October 2005*

**Memorandum by Thames Water Utilities Ltd**

**Executive Summary**

0.1 Thames serves a customer base of 8.2 million water customers. This is expected to grow significantly over the next 20 years and in addition we face a number of other challenges over both the short and long term regarding future water supply. We are also operating in a region of the country which experiences relatively low rainfall. Surprisingly average rainfall in the Thames region is below that experienced in either Istanbul or Rome.

0.2 Supplying London poses its own unique challenges. The most significant of these are the aged underground infrastructure, a high proportion of our pipe network is over 100 years old, and London’s corrosive clay soils. Older infrastructure is more susceptible to fracturing and leaking and consequently we currently have a high leakage rate in the London area. Further issues surrounding working in the Capital such as 24 hour traffic movement makes water main replacement disruptive and constant background noise makes leaks difficult to detect by conventional means. Our decision to undertake an unprecedented programme of water mains replacement to tackle leakage should mean we will start to see leakage reducing over the coming years.

0.3 However, the short term supply demand position is still vulnerable. In conjunction with mains replacement we need to develop resource options; in London our short term option is to build a desalination plant in East London, currently the subject of a planning appeal following a direction of refusal by the Mayor of London. London is currently experiencing a supply deficit which means the development of new resource options is critical to ensure our current levels of service are maintained. The longer term also poses challenges, this means planning for the future has to start now by investigating options for maintaining long term security of supply.

0.4 Water companies are encouraged by government to adopt a ‘twin track’ approach to water resource planning; this means looking at ways to manage demand whilst at the same time identifying options for increasing supply. This has to be done within the planning framework agreed by Ofwat, and seen as best practice by the water industry, which prescribes a least cost approach be adopted. Planning on a least cost
began to ensure that our customers are paying a reasonable price for their water services. However, this does mean we are restricted to choosing solutions that are not excessively expensive.

0.5 A great deal of research is undertaken by the water companies and the water industry research body UKWIR. This research means water companies are regularly reviewing the methodologies for forecasting future demand and supply.

0.6 Future demand is expected to rise as a result of the forecast population growth and reduced household size; because of this the potential for demand management activity to help reduce demand is great. However, much of what can be done in terms of reducing domestic customer demand lies with third parties, such as house builders, and relies on changes in consumer behaviour, both of which are beyond the direct control of water companies.

0.7 Planning for future water needs requires the understanding of a number of variables, with future growth being one of the most important. Historically planning bodies have not always fully embraced the issue of water provision when considering growth and developments. A more joined up, strategic approach, needs to be adopted if water companies are going to ensure adequate supply of water to developments of the future. The availability of resources and the ability of these resources to supply water should be considered early in the planning period to ensure timely development of the required new infrastructure and water.

DEFINING THE PROBLEM

1. What are the causes of the current problems of water supply, and how serious are they?

1.1 The question refers to ‘the current problems’ in water supply. Before we can discuss their causes or severity it is important to understand what they are. In brief, the problems are two fold. Firstly, according to accepted water resource planning processes, London is currently running a far higher risk of experiencing restrictions to water supply than is considered acceptable to either ourselves or our regulators. The second problem is that of meeting future demand projections which indicate an ever increasing need to supply, this longer term problem is addressed in question 2.

1.2 The current situation has arisen due to factors that lead to rising demand (changing demographics, increasing population, changing appliance usage, leakage) and factors that reduce supply (reduction in existing abstractions). All of these factors are discussed later in this paper. Brought together they mean that, should London experience a two year drought, there is a high risk that Londoners would be subject to restrictions in their water use, possibly as far reaching as rota cuts to supply.

1.3 In order to understand how this situation has arisen, it is necessary to understand a little about the operation of London’s water supply system. Thames Water currently supply 8.2 million water customers in the south east of England, which equates to approximately 2870 Ml/d (mega litres a day), that’s 2,870 million litres. Our customers have expectations regarding the standard of service we provide. We have agreed with Ofwat, the economic regulator, our levels of service, which place limits on how often restrictions should be placed on water supply, these are outlined in Appendix 1. Levels of service form the basis for planning for the future.

1.4 The average rainfall of London, approximately 610 mm/yr, is below that of cities such as Rome and Istanbul. At the moment approximately 55 per cent of average effective rainfall (rainfall minus evaporation) is licensed for abstraction in the Thames Basin, a much higher proportion than other areas of the country. The average rainfall of the Thames Water area as a whole is also low, approximately 690 mm / yr, which again falls below the average of the major cities already quoted. There is a general perception that Britain experiences high levels of rainfall but this is not reflected in the rainfall data for the south east of England. The volume and seasonal variability of the region’s rainfall directly impact on the water resource situation. Changes to either of these variables will imbalance the current situation and will mean further measures for maintaining supply will have to be adopted.

1.5 The geographical and geological nature of the our region means we are reliant on predominantly ground water sources in the west of the region, the Cotswolds and the upper Thames area, and surface water in the east and London. The source of the water supply is important as this determines the flexibility with which we are able to increase supplies in times of water stress, and consequently how we manage our supplies and plan for the future.

1.6 Thames water also has to have plans in place to deal with drought conditions, with different responses according to the degree of drought. This currently involves measures to reduce demand, such as media campaigns encouraging prudent water use, restricting the use of sprinklers and hosepipes where appropriate.
and increasing the level of abstraction by applying to the Environment Agency (the environmental regulator) for permission. The purpose of these activities is to manage resources at a time when there is stress on the system resulting from low rainfall whilst maintaining our level of service.

1.7 Historically, hosepipe bans were introduced at times of water deficiency to prevent the ‘waste’ of water used for non-essential use. Today’s society has a different view of the value of water and does not always view ‘leisure activities’ such as garden watering, or car washing, either as inessential or potentially wasteful. Future legislation and regulatory practice surrounding water use needs to consider these non-essential uses and the methods for reducing their impact, for example through the development of metered tariffs, which are variable, for example, with the seasons or at peak usage times.

1.8 London poses a unique challenge. It is very different to the rest of our region, and indeed the country for a number of reasons. The most crucial of these reasons are the Capital’s ageing water infrastructure, much of which dates back to Victorian times, and London’s corrosive clay soils. Because of its age, this infrastructure is more susceptible to cracking and therefore leaking which combined with a difficult physical and urban environment has a detrimental impact on the performance of our network as a whole. Although we undertake a large amount of leakage repair activity, the urban environment often makes leakage detection more difficult; the high building density and area under tarmac means leaks are often not detectable at the surface and 24 hour traffic movements and continuous background noise make leaks harder to detect.

1.9 The difficult conditions in London mean burst rates are well above the industry standard. London makes up by far the greater part of our customer base, the unique environment and the issues we face there, in terms of delivering water, mean we are in a very different position to the other water companies and consequently our performance cannot be compared on a like for like basis.

1.10 All available water supplies in London are currently being utilised. To continue to supply a growing population, at the current levels of service, means we have an obligation to identify new resources, alongside investigating methods for reducing demand. All water sources are currently operated in accordance with our Company Drought Management Plan (DMP), which sets out our approach to supplying our customers in drought years and detailing when supply restrictions will become necessary. Our DMP has been agreed and submitted to the Environment Agency. Since November 2004 we have experienced 10 months of below average rainfall, and in Thames Water the water resource situation has been under constant monitoring and review during the spring and summer of 2005. To date, and in accordance with the agreed plan, restrictions to supply have not been necessary.

1.11 The 25-year planning framework within which future water resource plans are made is based on a number of assumptions, described later on. If any one of these assumptions turns out to be misaligned this can throw out the entire supply demand balance. London’s leakage situation is a good example of this; higher leakage rates than predicted have meant a number of short-term supply schemes have been fast tracked to help improve the supply demand deficit issue.

1.12 The short-term supply deficit in London is the most critical problem currently facing Thames Water and is the reason we need to develop further water resources in the short term, such as the proposed desalination plant in East London in addition to accelerating our rate of mains replacement. This summer, in accordance with our DMP we started an extensive media campaign to encourage customers to be efficient with their use of water and inform them of the drought situation. The weather this summer although dry was not excessively hot. As a result, demand was not as high as we would expect in a hot, dry year and consequently we have not had to impose restrictions. However, we are operating at a higher level of risk regarding supply than we would wish and will need to develop further options in order to maintain supply in future hot and dry years.

2. What are the projections for future water supply, and what factors will influence these projections? Where, and over what timescales, may problems emerge?

2.1 Future water supply will have to increase in order to meet the increase in demand predicted due to factors such as population growth, reduced household size, climate change and new environmental legislation. When producing demand forecasts we also take on board a number of assumptions surrounding water usage. An overview of how our demand forecasts are generated can be found in Appendix 2.

2.2 In addition to the forecasts prepared by water companies the Regional Assemblies have also been preparing their Regional Spatial Strategies (RSS). For the Thames Area the principal strategies of interest are the South East Plan, being prepared by South East England Regional Assembly (SEERA) and the London Plan, prepared by the Greater London Authority (GLA). We are also influenced by the South West Plan,
being prepared by the South West Regional Assembly (SWRA) and the East of England Plan, being prepared by the East of England Regional Assembly (EEERA).

2.3 The London Plan forecasts population growth of 800,000 in Greater London between 2001 and 2016, but our demand forecasts were based on an earlier projection from the GLA, some 15 per cent lower. We have recently reviewed the effect of this difference, together with the Mayor’s recent proposals for increased housing targets for the London Boroughs. The Environment Agency’s response to these figures has been to report that they predict public water supply and demand deficits to occur over the planning period covered by the Plan, if new demand management options and resources are not developed. SEERA’s projections have also been reviewed by the Environment Agency, who similarly have identified the need for a combination of measures to be developed in order to meet future demand.

2.4 The south east of England is unique in that it has a high immigration rate, both from elsewhere in the UK and overseas, which increases the need for housing and for both domestic and commercial water supply. It is estimated that the population of the Thames Water region will increase by over 1 million by 2029–30.

2.5 Projected demand is increasing not just as a result of this population growth and climate change, but also as a reflection of how household size and the current demographic structure of the south east is changing. The trend shows a reduction in household size due to factors such as more people choosing to live alone or families being split between two households following divorce or separation. Smaller households tend to use more water per person, for example washing machines and dishwashers being used when only half full. To illustrate this, average household consumption decreases from 201 litres/head/day (l/h/d) for a single occupancy household to 134 l/h/d for a family of four. Water use habits are also changing with people washing more frequently and the increased ownership of water consuming appliances, particularly power showers. Showers currently make up nearly 30 per cent of household water use but this is predicted to rise to nearer 46 per cent by 2030.

2.6 Climate change is also expected to impact on forecast demand and the Company’s ability to supply water. Hotter summers, mean that people are likely to use more water both for bathing, watering the garden and filling swimming pools. Currently about 6 per cent of household water is normally used in the garden, but on hot days this can already rise to over 50 per cent (Source: Environment Agency). In addition to these impacts on demand, there is likely to be less rainfall in summer and consequently less water in rivers and in underground water-bearing strata (aquifers) to abstract during this period to use for drinking water. Research undertaken by the UK Climate Impacts Programme (UKCIP) and UK Water Industry Research (UKWIR) predicts a reduction of available water supply to the Thames area by up to 20 per cent by the 2020s.

2.7 The indications are that climate change will have an increasingly important impact on the availability of water supplies and that this will happen within the next 25 years. The result will be a reduction in the water supplies available, as well as the predicted increase in water usage.

2.8 New EU legislation (such as the Habitats Directive) will give greater protection to some sensitive environments. The Environment Agency is restricting the amount of water that can be taken out of the ground and from rivers in some protected areas. This is known as making “sustainability reductions”. In the Thames Water region, this particularly affects groundwater pumping in the Cotswolds and the Chilterns, which will have to be reduced over time. Investigations are ongoing to appraise the environmental impact of current abstraction licences; these will identify the number of abstraction licences that could be reduced or removed.

2.9 So how do we plan for the future? Each water company produces a Water Resource Plan (WRP) outlining the programme of measures, both resource development and demand management, that the company needs to implement to maintain the supply demand balance over a 25 year planning period. The WRP includes all data and information relating to future demand projections and supply options. It is scrutinized by the Environment Agency on behalf of the Secretary of State. Water Resource Plans are reviewed annually and revised at least every five years to accompany the Strategic Business Plan produced for Ofwat also every five years, known as Asset Management Plan (AMP) periods.

2.10 Water companies have to take decisions on what options to implement in the future well in advance of when the resource is actually needed, which means a fair level of risk is associated with future planning. The plan forecasts 25 years ahead to ensure that supply options to meet future demand are identified. Planning and development of these future options can take a long time often involving an Environmental Impact Assessment (EIA) to accompany a planning application, Public Inquiry and then long construction period, reservoir development being a prime example of this. Consequently although options may have been identified to meet demand in twenty years time, the planning and preparation of that option needs to start now, and it has.
2.11 We adopt a “twin track” approach when preparing our WRP. This means a combination of demand management and resource development options are chosen. We have been operating in this way for well over 10 years and consequently have experience of developing WRPs on this basis. This experience has meant we have a greater understanding of what is achievable in terms of supply and the savings in demand along with the uncertainty that surrounds certain types of options.

2.12 Water companies adopt a ‘least cost’ approach to water resource planning, considered ‘best practice’ by the water industry, to ensure customers are paying a reasonable cost for their water services. However, there is an obvious mismatch between long term resource planning and financial planning. Five years (the time horizon of prices fixed at a periodic review) is a very short timescale in relation to the time it takes to develop new water supplies except for the simplest of small groundwater abstractions. For major developments, covering up to five AMP periods, a reservoir for example, the process needs to be refined to accommodate this at a level of (operational and financial) risk acceptable to all parties.

2.13 A WRP based on a combination of measures reduces the risk that may be associated with only adopting one option for the future. A good example of this is the fragility of our mains network in London; up until Autumn 2000 we were slowly bringing the level of leakage in the capital down through a programme of active leakage control. The prolonged and heavy rainfall in the autumn of that year resulted in saturated, swollen soils causing the pipework to move and in many cases fracture, resulting in a huge rise in leakage, which could not be recovered, despite significant increases in expenditure on leakage control. Short-term supply options had to be brought forward to maintain the supply demand balance. By adopting a ‘twin track’ approach the uncertainty of some options and measures can be offset by the known certainty of others to deliver, thus maintaining overall security of supply.

2.14 Many complex techniques and methodologies have been developed to assess all these conflicting interests and to develop the preferred solution(s), some of these are described below. All are subject to technical audit by our regulators and many have been developed jointly with them.

3. Is sufficient research being devoted to predicting, and handling, possible future scenarios?

3.1 The UK water industry has an umbrella organisation, UK Water Industry Research (UKWIR), which coordinates common interest research on behalf of the industry. Whenever possible, work is done in collaboration with external parties, the Environment Agency, the academic world etc. Research covers a wide range of the issues relevant to the industry including climate change, water resources, and water quality, to name a few.

3.2 Over the last few years a great deal of effort has been focused on developing techniques to allow for the uncertainties in planning resources 25 years ahead to be examined. To account for potential supply and demand side uncertainty, relating to factors such as vulnerable abstraction licences, gradual pollution of sources, climate change and accuracy of forecast data, a methodology has been developed which tries to quantify these uncertainties and risks in terms of mega litres a day (ML/d) and add these on to the supply demand balance. This methodology, developed by UKWIR, represents the industry standard for dealing with supply demand uncertainty and results in a defined amount of surplus capacity (known as ‘headroom’) which allows us to continue to supply water to the service levels we have agreed in defined dry years e.g. hosepipe restrictions 1 year in 20.

3.3 Thames Water has followed the industry-recognised Economics of Balancing Supply and Demand (EBSD) framework for developing our WRP. This framework is the result of a collaborative study undertaken for the water industry by UKWIR, involving NERA (National Economics Research Associates), the Environment Agency and water industry representatives. The EBSD sets out the stages to be followed when preparing a water resource plan incorporating demand and supply forecasts, uncertainty (in the form of Headroom), sustainability reductions and future demand management (leakage reduction, water efficiency and metering) and resource development options. A model collates all this information and generates a programme according to ‘least cost’. Once an initial ‘least cost’ programme has been created a suite of sensitivity analyses is completed before a Final Plan is agreed upon.

3.4 Ofwat’s least cost planning methodology is based on the calculation of an Average Incremental Social Cost (AISC) for water resource and demand management schemes. The AISC is a combination of financial costs along with environmental and social impacts that can have a monetary value attributed to them. By using AISCs the financial and some of the environmental and social implications of a scheme are taken into account when developing a water resource programme. However, the use of AISCs for developing water resource programmes has been criticised by some groups as not going far enough to considering the environmental and social implications of schemes, as not all impacts can be monetised. It is widely acknowledged that it is
inappropriate to use the benefits transfer methodology (where the costs of environmental or social impacts in one study are assigned to similar impacts of a second possibly entirely unrelated study) which is why not all impacts are included in the AISC calculation.

3.5 Thames Water goes a step beyond AISC when preparing its water resource plan by undertaking a Best Practicable Environmental Programme (BPEP) assessment of a wide range of water resource and demand management schemes. The BPEP assessment captures those environmental and social impacts that are not monetisable and consequently places a greater emphasis on the environmental and social performance of water resource or demand management schemes. This assessment acts as a screening exercise to ensure that excessively environmentally or socially damaging schemes are not included in our water resource plan.

3.6 In developing the BPEP methodology Thames Water is going beyond Ofwat’s expectations for accommodating the environmental and social performance of demand management or resource development options. Taking this one step further, we have developed our own model, PROGNOSIS (Prioritising Resources Given Numerous Scenarios), which evaluates uncertainty explicitly with regard to long term water resource planning and looks beyond central case planning by using scenarios within the planning assessment methodology. PROGNOSIS assesses the performance of water resource programmes over a 25-year time horizon on the basis of supply capability, financial, environmental and social performance building on the assessment undertaken for the BPEP. During its development, PROGNOSIS was demonstrated to both Ofwat and the Environment Agency; both organisations considered it showed useful potential as a planning tool.

3.7 Climate change, as already stated, will have a major influence in the future and the water companies and Water UK / UKWIR are engaged with UKCIP and the climate modellers at The Met Office Hadley Centre undertaking research to understand the implications of climate change on water resource availability but we are dependant on their work.

3.8 Thames Water is internally undertaking a research project surrounding the potential for planned indirect potable reuse, defined as taking water from rivers that already have some element of sewage effluent from upstream, in the future. The study will assess public perception of indirect potable reuse as a supply option by undertaking surveys, carrying out a pilot trial for an indirect potable reuse scheme and identifying any potentially undesirable pollutants associated with the source water and methods for their removal. The results of these studies are expected by the end of the current 5 year AMP period.

4. Is the response of Government, the EU, regulators and the industry adequate? 

4.1 Each of the Water Industry’s regulators has different accountabilities, which means aspects of their advice can sometimes appear to be contradictory. Ofwat’s role is three fold; ensuring water companies have enough money through customer bills to fund and deliver the necessary works and resources for the coming years, whilst on the other hand, making sure customers are getting good service at an affordable price and finally ensuring that outputs are delivered as planned. The Environment Agency has a statutory responsibility for planning water resources to ensure that there is enough water for people to use and to protect the environment, in particular from possible impacts caused by over abstraction or through discharges made to watercourses. Often the types of decisions regarding water resource and demand management that the Environment Agency would like water companies to make regarding future demand or supply options, are driven by environmental concerns rather than least cost planning.

4.2 European legislation adds another regulatory dimension, the timing of which does not always fit neatly with the quinquennial cycle of the water industry. Currently the water industry is coming to terms with the implications of the Water Framework Directive.

4.3 The Strategic Business Plan (SBP) for AMP5 in 2009 will be submitted in the middle of discussions on the draft River Basin Management Plan (RBMP) to be produced by the Environment Agency as part of the Water Framework Directive, the extent of obligations may not be known, indeed as this is the first time RBMPs have been produced it is very likely the programme for delivering them may slip. If this happens it is feasible for the RBMPs to be finalised a year or two following the agreement of water company’s SBPs by Ofwat, so the work prescribed in the RBMP will not be funded. The six yearly cycle for the production of RBMPs means they will always fall outside the five yearly planning cycle of the water industry.
15 November 2005

**SUPPLY AND DEMAND**

5. What are the options for increasing water supply, and what are the arguments for and against?

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<thead>
<tr>
<th>Option</th>
<th>Pros</th>
<th>Cons</th>
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<tr>
<td>Reservoirs: River Regulation</td>
<td>Large water resource; provides amenity value; provides water during critical periods; long life; provides water habitat; offers long-term security of supply</td>
<td>Temporary disruption during construction; large structure with visual impact; large capital cost;</td>
</tr>
<tr>
<td>Direct Supply</td>
<td>Offers degree of protection against low flows and flooding</td>
<td></td>
</tr>
<tr>
<td>Reservoirs: Direct Supply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reservoirs: Direct Supply and River Regulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desalination</td>
<td>Proven technology with dependable outputs, provides resource from brackish/saline water; can provide resource in areas with no natural freshwater. (Particularly useful as a back up in periods of unusually high demand, emergencies or shortage of water availability from more conventional sources).</td>
<td>Energy consumption/operating costs (reduced with brackish water) high relative to conventional options; requires remineralisation.</td>
</tr>
<tr>
<td>Artificial Recharge</td>
<td>Sustainable; small surface footprint; can be cost-effective.</td>
<td>Limited options and limited quantity.</td>
</tr>
<tr>
<td>Aquifer Storage and Recovery:</td>
<td>Sustainable; small surface footprint</td>
<td>Uncertain; potentially expensive.</td>
</tr>
<tr>
<td>Groundwater Sources</td>
<td>Sustainable up to a point; can provide water to areas without surface waters</td>
<td>Not sustainable; likely to have significant additional regulation due to new environmental legislation; susceptible to long-term pollution.</td>
</tr>
<tr>
<td>Bulk Transfers</td>
<td>Sustainable and cost-effective.</td>
<td>Limited options available, especially in south east.</td>
</tr>
<tr>
<td>Sewage Transfer</td>
<td>Sustainable</td>
<td>Temporarily disruptive; limited opportunities.</td>
</tr>
<tr>
<td>Planned indirect reuse of waste water effluent</td>
<td>Sustainable; large resource; cost effective</td>
<td>Customer perception issues; expensive if use reverse osmosis technology; unknown problems associated with oestrogenics; need for programme of trade effluent controls—long lead time associated with researching and implementing these controls.</td>
</tr>
<tr>
<td>Rising London groundwater</td>
<td>Sustainable; prevents flooding/damage</td>
<td>Little remaining resource available—nearly fully utilised; poor water quality.</td>
</tr>
<tr>
<td>National River Transfer grid</td>
<td>Distributes water from areas of surplus to areas of need in a sustainable fashion.</td>
<td>Huge capital and operating cost and potential ecological issues from mixing of water.</td>
</tr>
<tr>
<td>Canal Transfer</td>
<td>Sustainable use of excess resource</td>
<td>Expensive; water availability may be limited at times of drought.</td>
</tr>
<tr>
<td>Raw Water transfer</td>
<td>Distributes existing resource to areas of need</td>
<td>Limited potential, and potential ecological issues.</td>
</tr>
</tbody>
</table>
6. What are the likely future trends in water demand?

6.1 In the UK, since the 1930s, water consumption per person has increased approximately 1 per cent per year. The current UK average household water consumption is around 150 l/h/d. In the south east household water consumption is slightly higher at around 160 l/h/d, predominantly due to the south east being an affluent region with a higher proportion of water using domestic appliances and higher levels of garden watering.

6.2 The demand for water is forecast to continue to increase as a result of projected increases in population, single occupancy households and appliance ownership together with the impacts of climate change. Between 2001 and 2015, Defra has forecast an increase in water demand by between 10 and 20 per cent depending on the rate of economic and population growth.

6.3 Thames Water currently supplies around 8.2 million customers and this is expected to increase by 1 million by 2029/30.

7. What can be done to manage demand more effectively and to influence the behaviour of consumers and others?

7.1 As already explained, Thames Water operates a twin-track approach to water resource management, which combines demand management measures with sustainable resource development. Examples of the former are outlined below:

7.2 Promotion of water efficiency

Over a number of years, Thames Water has developed a comprehensive programme to promote water efficiency to household and commercial customers. The aim of the programme is two fold, to contribute to the supply demand balance but also to raise awareness of more responsible use of water. Raising customer awareness is fundamental to water efficiency, because without a change in behaviour or attitude it is unlikely that consumers will be willing to embrace technological solutions to high water consumption, such as water efficient taps or showers, or grey-water recycling systems. The programme includes:

— Promotion of water efficiency to household customers through water saving advice and tips, the provision of cistern devices and subsidised water saving appliances such as water butts. The advice is provided through a variety of media including direct communications, web site and events.

— Promotion of water efficiency to non-household customers through advice, provision of materials and literature, domestic water audits and support for external campaigns such as the Envirowise “Big Splash” campaign.

— Educational activities with schools, including the provision of information and activity packs for children and teachers and dedicated websites. We believe that targeting young people will set them up with good water use habits for life and is fundamental to the long-term success of water conservation.

— Partnership working with other organisations including charities, councils, housing associations, government institutions and research bodies to identify new ways to achieve and promote water efficiency. For example, in 2003 Thames Water launched a partnership with Reading Football Club that received a commendation at the Environment Agency’s 2005 Water Efficiency Awards and has subsequently been rolled out to other Football Clubs in the Thames area.

— Research into water use, water efficient technology, policy and an active role in water efficiency networking groups and external research projects.

7.3 Thames Water has recently joined with other water companies and the industry body Water UK in forming a new independent organisation “Waterwise”. This has the aim of promoting water conservation and in particular exploring the economic case for water efficiency as an alternative (at least in part) to the development of new water resources.

7.4 It is worth noting that it is often difficult to quantify or attribute savings achieved from the implementation or promotion of water efficiency activities because human behaviour plays such a significant role. The 2003 UKWIR report ‘Quantification of the Savings, Costs & Benefits of Water Efficiency’ concludes that ‘... water efficiency investigations are not straightforward. Investigations in the real world are subject to the vagaries of human behaviour and small changes in highly variable patterns of consumption are difficult ... to monitor’. The risk to water resource planning is that such reductions are unreliable and may be transitory.
7.5 Metering

The Ofwat report “Security of Supply, Leakage and the efficient use of water 2003–04”, states that nationally around 76 per cent of domestic customers in England and Wales do not have a meter. In the Thames Water area, just under 80 per cent of our domestic customers are not metered. Industry research indicates metering can reduce water consumption by an average of 9 per cent (UKWIR, 2003).

7.6 Thames Water aims to substantially increase metering penetration over the next 25 years to approximately 60 per cent. However there are many customers for whom individual metering will not be practicable because they live in blocks of flats and similar accommodation with common supplies. We have started a selective metering campaign in the Chigwell and Swindon areas, where properties will be compulsorily metered on change of occupancy. The aim of this is to develop an improved understanding of the economics and practicalities of metering, whether this is acceptable to our customers and if the change in water usage is sustained or only temporary. The finding of this research will determine whether the scheme is rolled out over the whole Thames Water area.

7.7 It is recognised that large families on low income may suffer significant hardship as a result of compulsory metering as a much larger proportion of their income is spent on water compared to high earning households. For low income customers WaterVoice have suggested that financial help should be made available through the social security and tax credits system. This is an issue for Government.

7.8 Future demand management

Water resources in parts of the south east are under significant pressure and demand management is an important component to managing future water resources. There is currently a lot of focus on this area and a number of initiatives are under discussion, a summary of some of these and additional ideas to help to manage water demand are listed below. These will require further assessment and research to understand the practicalities, economics, effectiveness and acceptability. It is essential to understand the lead time and effectiveness of demand management activities in the context of planning to provide reliable and secure water resources:

1. Improvements in new build housing are currently being addressed through revisions to Part G (Hygiene) of the Building Regulations and the development of the Code for Sustainable Buildings.

2. There is also significant scope for improvements in existing housing stock, such as improved take-up of water efficient fixtures, fittings and appliances. Environmental think-tank, the Green Alliance, is currently looking at fiscal measures to incentivise sustainable consumption patterns at household level. This could be encouraged through various measures such as:
   — Subsidies to retrofit water efficient fittings and appliances.
   — Reduction in VAT on water efficient appliances.
   — Reductions in stamp duty or council tax rebates for water efficient homes.

3. Opportunities for greater use of non-potable water to meet non-potable demands. For example, grey-water for toilet flushing, rainwater for irrigation and car washing.

Untreated rainwater can be used for watering plants/gardens and topping up garden ponds, but rainwater should be treated (e.g. by filtration) if the water is to be used for WC flushing or cleaning. However, regular supplies of rainwater cannot be guaranteed, so grey-water (i.e. the wastewater from baths, showers and basins) recycling may be a more attractive option. In the UK individual household grey-water systems are not currently considered viable due to high installation costs and ongoing maintenance requirements (the systems are not ‘fit and forget’). Communal grey-water recycling systems are financially viable but provision needs to be made for ongoing maintenance.

4. Opportunities to directly link water usage and the cost to the consumer through extended metering and tariff structures. Water affordability is an important issue.

5. Ofwat currently prioritises activity with regard to economic principles and the economic level of water efficiency activity restricts action in this area. The water industry has recently established Waterwise, a five year project with an independent board and autonomous work programme to promote water efficiency in the UK.

6. Ongoing research to understand various aspects of demand management activities including the sociology of water use, how and why consumption varies, the sustainability of water efficiency programmes and to improving demand management.
7. The Water Supply (Water Fittings) Regulations 1999 impose restrictions on the installation and connection of water fittings and set standards on the requirements of fittings. Fittings shall not be installed, connected or used in such a manner that they cause or are likely to cause waste, misuse, undue consumption or contamination of water supplied and that every fitting shall be of an appropriate quality and standard (i.e. conforming to one of more approved technical standards set out in the Regulations). The Water Regulations Advisory Scheme (WRAS) grants approval to products that have been approved by the water industry as complying with the requirements of the Water Supply (Water Fittings) Regulations 1999. However, it is possible to buy water fittings that do not meet the requirements set out in the Water Regulations. Providing a greater degree of product information and raising customer awareness of this issue are seen as the way forward.

8. What contribution can science, engineering and technology make towards reducing water use or waste by households, businesses and the public sector?

8.1 In terms of more water-efficient white goods, manufacturers of such goods will contribute to innovation in this area as part of their on-going product development. Measuring the water use of these innovations will enable customers and suppliers to be more informed of useful devices. Defra are currently developing a water efficiency labelling scheme, similar to the existing energy rating scheme, for white goods which is due to go live in 2007.

8.2 Technology is also being developed to improve the measurement and understanding of water use. For example ‘Smart’ metering will enable customers and suppliers to track water usage more accurately and hence target areas for saving more appropriately. Smart meters can provide half-hourly readings and calculate consumption costs, allowing consumers to check at a glance how much they are spending. It will also help better identify areas of leakage and enable more strategic targeting of repairs to minimise water loss.

8.3 Technology for recycling and reusing water is being developed, but is currently only reliable and economically viable at a larger scale. Water companies such as Thames Water have undertaken major research and evaluation projects, such as the Millennium Dome in-building recycling scheme. However, one of the key findings of the latter and similar studies is that public perception and human factors can be as important as the technology itself in the successful implementation of water re-use and conservation initiatives.

INFRASTRUCTURE

9. What is the current state of the water supply and drainage infrastructure?

9.1 Water Supply

Much of Thames Water’s infrastructure dates back to Victorian times. In London 50 per cent of our water mains are over 100 years old, and 30 per cent are over 150 years old. The clay soils beneath London are acidic which means the old metal pipework is being slowly corroded. Results from recent investigations into the condition of these mains suggest the network is in poor condition and deteriorating, and as a result is becoming more susceptible to external forces. Such forces can be caused by third party damage and ground movements induced by climatic extremes, such as heavy rainfall or prolonged dry periods coupled with the highly refractive clay soils. This is reflected in burst rates across London which are significantly (approximately 3 times) higher than that for the rest of the industry. In central and northern parts of London the average burst rate is over four times that of the industry average. Leakage levels are consequently becoming more difficult and expensive to contain through find and fix activity alone. Burst rates in the Thames Valley (outside London) are close to industry average.

9.2 Drainage

Our sewers in London are similarly old and subject to the same aggressive soils but are made from brick and therefore more able to withstand the metal pipes. Collapses rarely cause sewer flooding and are therefore hard to detect if they do not cause a failure to service. Therefore to gain improved understanding of the underground assets to enable effective investment targeting, CCTV inspections across London will enable improved understanding of sewer condition and will aid the targeting of sewer rehabilitation.

10. Is there sufficient investment in its improvement?

10.1 During the last AMP period (1999—2004) there was relatively little investment approved by Ofwat for the renewal of the London mains, bearing in mind their length, age and condition. In previous AMP periods many companies in the UK have undertaken the replacement of mains driven by the need for water quality improvements. In London water quality was already good so little replacement was undertaken. However, we
have now managed to convince Ofwat of the need to invest in a major mains renewals programme as part of a least cost programme to manage supply and demand and deliver sustainable leakage reductions. The mains in Metropolitan and North London are in the poorest condition and these are being targeted first.

10.2 Over the last few years we have replaced 140 miles of water main in London and over the next 5 years we plan to replace another 850 miles of water main at a cost of approximately £500 million. With costs so high the extent of the programme must be balanced against other needs, for example dealing with sewer flooding, meeting environmental obligations, including reductions in abstractions. Renewing the mains of London is slow and complex with many difficulties, such as that associated with working in very congested areas (both above and below ground), obtaining the necessary skilled work force and the need to manage traffic disruption, which restricts the rate at which the programme can be delivered. In the meantime we will continue to ‘find and fix’ high numbers of visible and hidden leaks. To give an indication of the challenge facing the company, we currently need to detect and repair almost 70,000 leaks each year simply to hold leakage at current levels.

10.3 In order to maintain our sewers we determined activity levels required to deliver an improved sewer collapse performance, taking into account the relative performance deterioration in our sewer stock. In order to stabilise our sewer stock it is necessary to carry out proactive rehabilitation activity. CCTV is a useful tool to determine where sewer rehabilitation is required, and over the next 5 years we will be aiming to replace and rehabilitate 260km of our sewer stock and survey 2600km of sewer using this method.

CONTEXT

11. The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at national and European levels, adequate?

11.1 Under section 93A of the Water Industry Act 1991, water companies were required to promote the efficient use of water by all their customers. This legislation did not permit water companies to impose water efficiency measures on their customers. The water companies developed comprehensive programmes to promote water efficiency to household and non-household customers and report annually to Ofwat on their performance.

11.2 The Water Act 2003 amended previous legislation and introduced new duties regarding the efficient use of water resources and the conservation of water:

— A duty to take any action as necessary for the efficient use of water resources as part of its general duty of conserving, redistributing and otherwise augmenting water resources (S72).
— A duty of the Secretary of State to take appropriate steps to encourage water conservation, and to report progress to Parliament every three years.
— A duty for water undertakers (and Ofwat) to further water conservation.
— A duty for all public bodies to take into account the desirability of conserving water supplied to premises.
— A duty on Ofwat to contribute to the achievement of sustainable development.

11.3 The extent to which the duty regarding water efficiency applies still needs clarification. Defra is currently preparing guidelines for the implementation of the new duties and we will be keen to engage in any consultations in this important area.

11.4 The Water Resources in the South East (WRSE) group highlighted in it’s contribution to the development of the South East Plan that significant water savings could be made following the introduction of water efficiency measures, however, some measures would require enabling mechanisms for them to be successful, for example, changes in building regulations (WRSE, September 2004).²

11.5 As highlighted in paragraph 7.8 (1), water efficiency and improvements in new build housing are currently being addressed through the revision of Part G of the Building Regulations.

11.6 The Institute for Public Policy Research (IPPR) have recently put forward a draft proposal for a new project to consider policies to help achieve improvements in water efficiency in existing housing stock. This proposal came about as a result of the recommendations put forward in the Commission on Sustainable

² Water Resources in the South East (WRSE) group is led by the Environment Agency working closely with the Water Companies in the SEERA region to examine the supply demand implications of the SEERA housing growth scenarios.
Development in the South East’s report ‘Managing Water Resources & Flood Risk in the South East’. IPPR have identified that while water efficiency in new homes is now being addressed, there is tremendous scope for improving efficiency in the existing housing stock.

12. How does water figure in the development of Government policy in areas such as housing, land use planning and industry?

12.1 Water hasn’t always been embraced fully as a material consideration in planning policy, perhaps due to a lack of understanding or joined up thinking in relation to how water issues impact on the land-use planning system. The two elements of land-use planning and water management are governed by two distinct sets of legislation which have differing purposes, and which often do not interact well. Land-use planning for example is a forward looking, policy driven regime, designed to consider social, environmental and economic issues well into the future. Planning for water management, whilst required to look ahead to a 25–30 year horizon is tightly regulated through the 5 year AMP process.

12.2 As such, whilst various Government policy statements have made some reference to water, the extent to which these have applied in practice has varied greatly. Strategic and well meaning statements have been included in some national policy guidance, but it is less clear how these have been followed through and actually made a difference in relation to policy for housing for example.

12.3 Government policy statements regarding water have been made historically in numerous circulars and guidance notes. Some examples are:

— Circular 20/89 (para 34)
— Circular 17/91 (para 12)
— Planning Policy Guidance (PPG) Note 11 (October 2000) (para 2.34)
— PPG 12 (para 6.15)
— PPG 23 (annex 3)
— PPG 11 (annex A, p.57)
— PPG 12 (annex B, p.64/65)

12.4 The focus generally is around delivery of infrastructure and the interaction between the local planning authorities and water companies in achieving this. Unfortunately this in itself is not yet well understood by all stakeholders in terms of what is expected of the water companies in engaging in the planning system, bearing in mind the statutory duties imposed through the Water Industry Act 1991 as amended in 2003.

12.5 There would appear to be less focus in the development of Government policy for land-use planning and housing on water issues in a more strategic sense. As an example, planning for Sustainable Communities emerged as a strong policy direction from Government with little consultation with the water industry beforehand. Due to statutory duties which the water companies must comply with, when consideration was made of the emerging proposals, the issues were not necessarily related to “if” water could be supplied/managed, but “when” i.e. phasing and timing of development, and the ability to accelerate water resource plans to meet the growing demands.

12.6 Thames Water has made considerable effort with both the regional planning bodies and local planning authorities to raise water issues as early as possible in the planning process. For example, the draft South East Plan is based on work undertaken jointly between SEERA, the EA and the water companies, involving assessment of the impacts of varying scenarios for growth. Discussion also focused on the planning policy to be included in the Plan in terms of the delivery of new water resources and water efficiency through Local Development Frameworks and the development control system.

12.7 What appears to be missing is a thorough understanding and explanation, as to how the two regimes (land-use planning and water resources planning) interact and what the Government policy for this is. It is a complex matter and without clear guidance it is perhaps not surprising that Government policy for land-use planning does not address water issues as fully as it might otherwise.

13. What can the UK learn from the experience of other countries?

13.1 We review the research and activities being undertaken by water companies internationally and take the findings of these on board. However, all international studies have to be put in the context of the UK, particularly information relating to consumption levels and water using devices. Typically the average UK consumption per head is around 30 per cent of the American average and roughly 50 per cent below the
Australian average. So UK water companies are starting from a much lower consumption rate when trying to achieve customer water saving.

13.2 A large-scale lavatory cistern replacement project was undertaken in New York a few years ago that saw large savings in water consumption being made. Prior to the study the size of the average cistern was considerably larger than the capacity of cisterns fitted in the UK. The building regulations in the UK stipulate the size of cisterns and consequently it is not anticipated that similar savings could be made in the UK.

13.3 A number of studies have been undertaken in Australia and Singapore surrounding water conservation methods. The sort of information collected is useful for informing UK water company policy. One area we could learn more about from our European neighbours is tariff structures, as applied to metering strategies, in particular the potential use of rising block tariffs, where the price of water increases the more water the customer uses.

October 2005

APPENDIX 1

Levels of service and restrictions on water supply in the event of a water shortage.

<table>
<thead>
<tr>
<th>Restriction</th>
<th>Definition</th>
<th>Target Service Level (how often restriction is allowed to be imposed, according to Ofwat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Media campaign to highlight water saving, water efficiency, pressure optimisation</td>
<td>Whenever necessary</td>
</tr>
<tr>
<td>Level 2</td>
<td>Enhanced media campaign to encourage customers to use voluntary restraint, sprinkler ban</td>
<td>Once in 10 years</td>
</tr>
<tr>
<td>Level 3</td>
<td>Hosepipe ban, prohibition of non-essential water uses eg for leisure, some irrigation, cleaning buildings and vehicles</td>
<td>Once in 20 years</td>
</tr>
<tr>
<td>Level 4</td>
<td>Rota cuts in supply or cessation of supply to all properties (domestic and commercial), use of standpipes</td>
<td>Never</td>
</tr>
</tbody>
</table>

APPENDIX 2

DEMAND FOR WATER IN THE THAMES REGION

This section explains the basis for calculating how much water is needed in the Thames region, and for predicting demand for water in the future. It describes how forecast demand has increased significantly over recent years due to population changes particularly migration into the Thames region and the increasing intensity of water use by customers. It highlights the difficulties inherent in trying to predict the effect of these and other critical influential factors, such as climate change, on the demand for water. It also explains the safety margins used by Thames Water to take account of this uncertainty when it is planning how to provide enough water for its customers’ needs over the next 10-25 years. The demand for water is worked out based on three main factors:

- usage by domestic customers, termed household factors:
- usage by commercial customers, termed non-household factors:
- the amount of water lost from the network system through leakage.

Leakage of treated water from the mains network is included in the demand calculations because it is one of the components that reduces the supply of water. Once raw water has been abstracted and treated at a water treatment works, it is distributed in the water mains. Some of the water is used by household customers; some by non-household uses; and a further quantity is lost from the supply system through leaks in the pipes. Typical components of household and non-household usage are listed in Table 1 below.

These components added together give the quantity of water that is needed to be put into supply at present. However, it is necessary for water companies to predict how much this figure will go up or down in the future, in order to be able to plan to meet demand effectively and efficiently.
The current demand figure thus has to be adjusted to take account of possible future events, the key influencing factors are:

**population growth**—Thames Water derive population forecasts from a combination of Office of National Statistics projections based on annual census data, and Greater London Authority (GLA) and County Council projections based on planned housing development. Further additions are made to reflect Government plans for additional housing within the Thames region (for example, parts of the Thames Gateway development).

**social changes**—more people are living alone or in smaller family groups, partly due to the aging population and the high rate of separation and divorce. The projected rate of household occupancy (ie the number of people typically living together in one house) is getting smaller over time. This in turn results in greater consumption of water because of the loss of economy of scale (for example, one person living in a house with a garden will need as much water for watering the garden, washing the car and cleaning the house as two or three people would do).

**climate change**—climate change is predicted to result in hotter, drier summers and wetter winters with more intense rainfall events. This means that there will be greater demand for water in the summer, because people will want to bathe or shower more frequently and use more water in their gardens, while at the same time, there will be less water available to abstract.

### TABLE 1

<table>
<thead>
<tr>
<th>Household</th>
<th>Non-Household</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In-house</strong></td>
<td></td>
</tr>
<tr>
<td>WC Flushing, Personal Washing (including power showers, jacuzzis etc).</td>
<td>Business Services</td>
</tr>
<tr>
<td>Clothes Washing, House Cleaning,</td>
<td>Public Services</td>
</tr>
<tr>
<td>Dish Washing, Waste Disposal Unit,</td>
<td>Mining/utilities/construction</td>
</tr>
<tr>
<td>Cooking Water, Drinking Water</td>
<td>Food/drink/tobacco</td>
</tr>
<tr>
<td><strong>Out-of-house</strong></td>
<td>Chemical industry</td>
</tr>
<tr>
<td>Car washing, Lawn watering,</td>
<td>Engineering</td>
</tr>
<tr>
<td>Plant watering, Paddling/Swimming Pool, Other</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Agriculture/fishing/forestry</td>
<td></td>
</tr>
</tbody>
</table>

Accurately predicting what effects these factors will have on future demand is extremely difficult. To illustrate this, customer demand for water in London is currently over 130 million litres per day (ML/d) greater than that originally forecast in 1999.

In addition to the base demand, Ofwat and the Environment Agency require water companies to add headroom. This is an additional element of demand which represents a safety margin to ensure that there is sufficient water made available for customers in an average dry summer. The headroom element is risk-based and increases over the period of time for which demand is forecast, as there is greater uncertainty the further forward water companies try to predict. Target headroom is thus set (consistent with Environment Agency guidelines) at 5 per cent for the period up to 2010; 10 per cent for the period 2010–15; 15 per cent for the period 2015–20; and 20 per cent for the period 2020–25.

Depending on the degree of connectivity of the water resource infrastructure within a zone, there will be greater or lesser flexibility to move water around within the zone. This means that for some zones, the most difficult conditions in which to maintain supply are over a long sustained dry period, in which case water resource planning is driven by what is termed “average demand”. In other zones it is more difficult to maintain supply during sudden short term peak demand periods, in which case water resource planning is driven by “peak demand”.

**15 November 2005**
Examination of Witnesses

Witnesses: Ms Margaret Devlin, Managing Director, and Mr David Shore, Operations Director, South East Water; Mr Werner Boettcher, Managing Director, and Mr Rob Harrison, Director of Asset Management, Thames Water, examined.

Q121 Chairman: Welcome and I am sorry we have delayed Mr Shore’s and Mr Harrison’s arrival at the desk there. I do not know whether you would like to introduce the new team.

Ms Devlin: Perhaps if we introduce them individually. David Shore is the Director of Operations for South East Water, responsible for all elements of water, from collection right the way through treatment and delivery to customers’ homes. Mr Boettcher: Rob Harrison is Director of Asset Management for Thames Water, responsible for the planning of all the capital programmes for the next five years and beyond.

Q122 Chairman: Thank you very much. I am going to ask the first question which is directed specifically to Thames Water. In the written evidence that Thames Water Utilities gave us, you made it clear that you have inherited very considerable problems of infrastructure. It is excellent Victorian infrastructure but it clearly needs an awful lot of maintenance. In the chart of the options, pros and cons, which has already been referred to, you do draw attention to the rising London ground water which you describe as nearly fully utilised and also the poor water quality. That seems to me to be slightly mutually contradictory. Either it is fully utilised or it is poor water quality and unusable. Which is it?

Mr Boettcher: We cannot abstract all the groundwater because we need to understand what quality comes with it. If the quality of the ground water is not good enough, it is just too expensive to treat this in a way that it is then drinking water.

Mr Harrison: If I may add, my Lord Chairman, we have worked closely with the Environment Agency over what levels of sustainable abstraction are possible within the London Basin and we are close to those levels of abstraction. What we are finding in certain areas of the catchment is that when we try to abstract water, we are drawing up water which has, for instance, a high level of salinity which becomes very difficult and expensive to treat in small and localised areas.

Q123 Chairman: But given that Thames Water, particularly in the London area, does have these very specific problems, it seems to me a little surprising that the charges that you are imposing on your customers are middle of the league. You clearly have problems which are much worse than many other areas and yet you are not charging more than the average and yet, as you say, there are solutions which are technically perhaps rather expensive which are clearly going to be needed if there is going to be a supply to these millions of customers that you are supplying. Why is it that you are relatively modest in your charges given that your concerns are so great?

Mr Boettcher: We are embedded in the incentive based regulation from Ofwat so we put together for each price review a strategic business plan where we suggest what needs to be done and in what areas we need to invest to deliver the service and then the regulator sets price limits, and that is what happened. In this price review we are going to increase our water charges over the next five years by 22 per cent, which we believe is a huge increase.

Q124 Baroness Platt of Writtle: What are you doing to prepare for the predicted reduction in available water supplies over the coming decades?

Mr Shore: If I could address that on a general basis. All the water companies within their 25-year water resources plans do take into account the predicted impact of climate change and the various Directives that are coming along with estimated impacts on the reduction of supply that will be available. Everybody is working to a standard industry methodology on this. So the water resources plans themselves do already take this into account.

Q125 Baroness Platt of Writtle: There are two supplementaryaries. One of course is London on the Olympics Games particularly if there is a refusal of the desalination plant, and we have also been talking earlier about desalination being expensive in energy terms. I wonder how those two contradictory things are going to impact?

Mr Boettcher: If I may answer on the desalination point, Thames Water has applied for a desalination plant to be built. Clearly this is not a desalination plant as we might expect in the Middle East where we have thorough treatment which treats saline water. What we wish to treat is brackish water, to take water from the estuary of the Thames at low tide and use a desalination technology which is reverse osmosis. It is state-of-the-art technology which is a good thing in principle. It is just called a desalination plant because you have similar technologies in the Middle East and you could treat it with this technology.
**Q126 Baroness Platt of Writtle:** What about the energy use?
*Mr Boettcher:* It does use more energy, we have to accept that. However, traditional treatment does not require a lot of energy and this uses more energy, we do know this and we accept this. However, this plant would only be operated in times where we have drought situations and where we need to meet higher customer demand in the summer, for example, and it is not meant to be to run 24 hours, 365 days.

**Q127 Lord Howie of Troon:** I wonder if I could ask you a question here of South East Water. It says that you plan new reservoirs. Can you tell me where they are likely to be, in the South East or somewhere else connected by a pipe?
*Mrs Devlin:* Was that directed at South East Water?

**Q128 Lord Howie of Troon:** Yes.
*Mrs Devlin:* In our water resources plan, over the next 25 years we have a new reservoir proposed and in those five years we will be investigating the feasibility of developing it, which will include the location of that reservoir. It will be in the South East of England. We are not planning to build a reservoir in the north and pump it south because that would not be cost-effective. As I said earlier, it will take more than the five years.

**Lord Howie of Troon:** You do have a potential site, do you? You do not need to tell me where it is.

**Q129 Chairman:** You got approval for your desalination plan from Ofwat?
*Mrs Devlin:* Yes, we did.
**Chairman:** This goes with it. Lady Sharp?

**Q130 Baroness Sharp of Guildford:** We were talking earlier about the adequacy of funding and the whole question about where you set your charges and so forth. How far will the sale of Thames Water by RWE affect your service delivery? How susceptible are you to resulting structural changes? What sort of safeguards are in place to ensure that the proceeds from any asset sales are ploughed back into the business?

**Mr Boettcher:** If I may answer this, my Lord Chairman. The disposal of Thames Water, that is the water division of RWE, will have no impact on the regulated business of Thames Water Utilities. We are embedded in a regulatory framework. We have regulatory outputs which have been set by Ofwat, our regulator, for us to meet. We have to meet customer standards which are targets being set by the regulator as well, and we need to provide the service. So for the actual core business I do not envisage changes when the company is sold maybe next year.
this regulatory period and we are on track to meet those targets. We envisage that we are going to have achieve an economic level of leakage by 2010, not 2015.

Q134 Lord Patel: So that is an improvement?  
Mr Boettcher: It is an improvement.

Q135 Lord Patel: What about water pressure?  
Mr Boettcher: Water pressure is an instrument for us to balance water pressure in a district and we have districts where the water pressure at one end is very high and at the other end very low, so we need to balance this out. That could lead in tall buildings, for example, to people living in the upper floors experiencing low pressure. We as a company contribute 50 per cent of any booster pump that needs to be installed in these properties and this is funded by the company.

Q136 Lord Patel: Who funds the other 50 per cent?  
Mr Boettcher: The owner of the property.

Q137 Lord Patel: So your strategy for water pressure management will make people living on the top floors of a high-rise building pay for pumps to get their water?  
Mr Boettcher: We deliver at every property the statutory minimum of pressure we need to, so it is not that we are not fulfilling our duty with the extra pressure we need to deliver. We need to understand why we are doing it. We have in some areas, because of different pressure variances in a zone, high burst rates and this leads to interruption in water supply to the people living there. Equally, balancing water pressure in a zone is providing a better supply and a more stable supply. However, you are right, in tall buildings, people who may have higher pressure at the moment, higher pressure than our statutory duty, may experience reduction of pressure and in some cases a booster pump station might be required.

Q138 Lord Patel: What about fire-fighting, would it affect fire-fighting?  
Mr Shore: My Lord Chairman, perhaps I could come and talk a little about pressure management and why companies are doing it. It was actually a House of Lords Technical Committee report in the 1970s that identified the linkage between pressure in systems and the level of leakage. Pressure management is a major tool in all water companies’ armouries in managing leakage, not just managing the burst rate but managing the amount of water that comes out of each small leak. It is a highly integral part of what we do. In places we all have these problems where the reduction in pressure exposes the inadequacies in internal plumbing. This is something we have to wrestle with—the good of the individual property against the greater good of the community. The same is true of fire fighting. Is there adequate pressure? In general, the fire authorities liaise very closely with the companies in ensuring they know which of their hydrants work and if they work adequately. Their tenders usually carry sufficient water to deal with most fires and they use supplementary water from our hydrants. There is a lot of work going on to make sure those hydrants are operating and working efficiently and do provide the water.

Q139 Chairman: I wonder if I could come back to reducing leakage and Mr Boettcher’s relatively optimistic note. I have in front of me a London Assembly report of March 2005 Down the Drain and they, you may remember, were critical of Thames Water as it had failed to reduce mains water leakage despite the high levels of investment. That was Dr Spillett’s evidence of over £80 million invested and he said rates of loss had worsened 43 per cent since 1999. Is that correct or did they get that wrong?  
Mr Boettcher: Can I pass that question on to Mr Harrison.

Mr Harrison: What we have experienced is in the late 1990s we were successful in reducing leakage. What happened in 1999, and for the subsequent two years, exposed the fragility of our network in London where when we experienced climatic events like the very wet autumn and the very cold winter of 2001-02, we saw leakage outbreaks rise very much more in Central London than in the outer parts of London and our provinces area, and what that expressed is that for Central London the traditional approach to tackling leakage through repairing leaks as they outbreak is not effective in dealing with that situation. In 2003 we started a pilot to understand how by replacing the infrastructure we could get on top of the leakage issues, especially in Central London. By conducting very detailed research on the problem we have got to grips and persuaded our regulator that part of the solution to London’s future security of supply is to replace the areas where the network is suffering these problems and that is where we get to the 850 miles of pipework that has to be replaced in the next five years. That is half of the solution to our supply/demand problem over the next five years. The rest is down to the twin-track approach of the resource development, and to go back to the desalination plants required, to balance supply and demand by the end of the period when we have achieved economic levels of leakage.

Q140 Chairman: Ofwat have required what of Thames Water in the latest review on leakage? They were critical in 2003-2004. This year, have they taken
Q141 Lord Howie of Troon: This question is for South East Water, of which I think I am a customer, as it happens, and I am a customer of Thames Water as well, by the way. In your submission in your reply to question three on page whatever it is, you tell us that the water industry funding mechanism of RPI + K has meant that many companies’ research and development budgets have all but disappeared. Do you think this regulation is beginning to restrict innovation? Can you tell me something about this and how it can be rectified?

Mr Shore: I think what we are looking at here is the efficiency of impact targets. They are tough and they are relentless. Every year we have to reduce our operating costs and our current target is 1.5 per cent every year, so every year our budget is under continuous scrutiny and while we continue to contribute to UKWIR and central research, any other budgets, including R&D, come into the pot with everything else where we are looking to find savings, so they are continually being held up against the short-term needs of defined efficiencies. What we tend to be looking at here is will this project make a short-term return, in that period, particularly with the whole system where efficiencies are handed back at the end of the five-year period. What we are tending to see is a push towards if we fund anything at all it is something that is very practical, very front-end and it is going to produce a short-term saving. The companies’ funding of some of the more blue skies type of research is becoming more and more difficult to sustain, I would suggest.

Ms Devlin: In terms of the second part of that question and what could be done about it, if you look at the example of Ofgem where they specifically fund a percentage of turnover which must be ring-fenced for R&D and if it is not spent on R&D the money must go back to customers. I think that is an area that needs further exploration.

Q142 Lord Howie of Troon: Is there any other way you can raise revenue for this purpose?

Ms Devlin: Our revenue comes directly from customers so maybe exploring this idea of specific funding for R&D might be the way forward when we look at reviews of the regulatory system.

Q143 Lord Howie of Troon: You are limited to the amount you can borrow and so on, I take it?

Ms Devlin: We are.

Q144 Lord Broers: Are you seriously affected by non-payment of bills? Do you have to charge people more because of this? What can you do about it?

Ms Devlin: One of the areas that I think is quite important on non-payment of bills is perhaps an underlying assumption that those people who are not paying their bills cannot afford to pay their bills. I can only speak for South East Water in respect of this and the statistics I give you are South East Water statistics, but we have done some analysis of our customers and approximately two-thirds of the customers who owe us money have a credit rating of over 400, in a range of 0 to 650, so two-thirds of the customers who owe us money actually can afford to pay us. You might say, well, you have got the remedy of taking people through the courts but those people are exercising a choice not to pay their bill and by doing so are adding £10 to every other customer’s bill, including those customers who cannot afford to pay. So I think there is an element of customers who choose to abuse the current situation and do not pay their bill. Equally, at an industry level there are round about 27 per cent of debtors who have an income of less than £10,000, so there is an issue there that has to be dealt with in terms of affordability, and clearly we need to look at the Department for Work and Pensions, and benefits those customers could get, but I do not believe it is the job of the water companies to fund those customers who cannot afford to pay their bills. That is an issue that has to be dealt with through social policy. For me the other area, as I said, is simply those customers who are choosing not to pay their bills. Just to make you all aware, we are not saying that we want to go back to the days of disconnection because we all realise most companies did not disconnect customers but the threat was there, but maybe we need to be looking at something like flow reduction to those customers who will not pay their bills.
Ms Devlin: Take you to court.

Q146 Lord Howie of Troon: Oh dear!
Ms Devlin: Exactly.

Q147 Lord Lewis of Newnham: What percentage of your customers do not pay their bills?
Ms Devlin: Our turnover is just under £100 million and we closed the year at 15 per cent of that turnover being outstanding as debt, so £15 million.

Q148 Lord Howie of Troon: Do you take many to court?
Ms Devlin: We are going through the process.

Q149 Lord Howie of Troon: What I am saying is how hard are you trying to get the money?
Ms Devlin: We are trying very hard to get money.

Q150 Baroness Platt of Writtle: Good!
Ms Devlin: Taking somebody to court is very much the last resort. We use debt collection agencies who are formed by the companies to actually try and collect those funds. We take all sorts of other action such as attachment of earnings. However, all of that adds to the cost of our debt collection which is passed back to customers, so we need to address those people who are exercising a choice and not paying their bills.

Q151 Chairman: You referred to the group who clearly can and should be paying for their water, but there is the Vulnerable Groups Tariff which caps meter charges at the average meter charge for which there is very little take up. We are told that only 7,200 households take it up out of five million measured households. There must be more people in hardship than that, in fact I am sure there are. What needs to be done to provide financial support for water supply for people in these low income groups in order to pay their water bills?
Ms Devlin: First of all the criteria for vulnerable groups—and forgive me I do not have them right in my head—is quite specific about what and how you would classify a vulnerable group in terms of whether you get that aid, for want of a better word. That may need to be looked at in terms of is that sufficient going forward, which very much ties in, of course, with the argument and discussion about metering and affordability which we touched on earlier. A lot of water companies, and South East Water is one, fund a trust fund or a debt fund which customers can go to to seek assistance, and we promote that through the Citizen’s Advice Bureau and money advice centres, etc., but that is done directly by the companies. In terms of what else can be done, I do think that we need to look at the benefits system in terms of whether that is sufficient to enable customers to pay their bills.

Q152 Lord Patel: It was just a supplementary but I think it might have been answered. There was a proportion of non-payers whose credit rating was high.
Ms Devlin: For two-thirds of those who owe us money their credit rating was above 400.

Chairman: I think that brings us to the end of what has been a slightly longer session than we might have expected but that is because of the great amount of very helpful evidence that you have given us in answer to our questions. Thank you very much to all of you for the help you have given us today. If there is anything further that you would like to add, do please put it in writing to us. If there is anything you feel we have not given sufficient time to, do please send it in and we will make sure that that is included in the evidence. I think you did say you would send figures on turnover spent on R&D. That would, for example, be very helpful.

Lord Mitchell: We also asked for figures on domestic use, industrial use and agricultural use.

Q153 Chairman: If that extra information could be provided, we would be most grateful, and anything else you feel might be helpful. Thank you again very much for your help.

Ms Devlin: Thank you very much for giving us the opportunity.

Supplementary letter from South East Water

I would like to address the two questions which were left with South East Water as recorded in the transcript from this evidence session. The information provided reflects South East Water’s customer base and, as such, may have different characteristics from other water companies operating in other parts of the country.

Figures on domestic use industrial use and agricultural use

On average, 75 per cent of South East Water’s demand comes from domestic customers, although this can fluctuate over the year because domestic customers have changing demands between summer and winter, whereas commercial demands tend to remain constant. At its peak in summer, customer demands can represent over 80 per cent of total demand for water and it is this increase in demand which we consider to be
recreational use, associated with, for example, garden watering, which we try to manage downwards during times of peak demand by raising awareness of the situation through, for example, increased promotion of the water efficiency message.

The water demands of agriculture are reported within overall industry demands by the water industry and no formal differentiation is made between the two. The agricultural industry takes a proportion of its water directly from natural sources, as there is no need to treat the water to potable standards. However, often it is more cost effective to use the infrastructure provided by the water industry and take a potable water supply, rather than install duplicate infrastructure to enable irrigation with untreated river water. Of course, it also depends on the proximity of the farming area to the water source. Analysis of South East Water’s customer base indicates that, of industrial demands, approximately 3 per cent is from the agricultural sector.

Information on demand management

Lord Mitchell enquired whether information was available to convince him of the potential benefits from demand management, when compared to the demands of industry and agriculture. Work carried out by the Water Resources in the South East group, which includes several water companies, English Nature and the Environment Agency, has identified savings in new water efficient homes of between 8 per cent and 25 per cent, when compared with the existing housing stock in the region. Given the balance of commercial and domestic demands mentioned above, the savings represent a potential reduction in customer overall demand of between 20 and 60 million litres a day.

However, it is widely recognised that these forecast savings require thorough testing and, as mentioned in our session on 15 November 2005, the industry has set up Waterwise, which is a not for profit company with a 5 year plan to test the effectiveness of water efficiency initiatives. To include these initiatives in their plans, water companies will need to be sure that water savings can be achieved and sustained. Companies will also need to be sure that the economics of these options compare favourably with resource development options.

Given the high percentage of demand that is derived from domestic use as noted above, these savings can play a major role in balancing supply with demand over the next 25 years, if delivered effectively. It is surprising to see that that the buildings code updated by ODPM has been made only a voluntary guide, rather than a mandatory requirement. Given that the water industry alone does not have powers to enforce water efficiency in new build homes, we consider it is essential for all stakeholders to support water efficiency in new homes. The production of the sustainable buildings code as an optional requirement could be viewed as a missed opportunity to make a significant contribution to sustainable development.

Turning to industrial use, the water industry continues to pursue demand management savings with industrial users, in the form of water audits for example. Given that nearly all commercial users are metered, they are generally keen for us to audit their water consumption because it provides them with an opportunity to save money.

The same cannot be said for domestic customers, because approximately 75 per cent of domestic customers in England and Wales pay on an un-metered basis and, as Lord Mitchell points out, it may make them feel good, but, given that there is no monetary benefit, water savings are less likely to be sustained in the long term.

It is our view, as we stated at the evidence session on 15 November 2005, that water companies should be permitted to meter all customers, as it is the fairest way to charge for the water used. Paying for water and the affordability issue is a separate matter and one which, whilst being a key stakeholder, is not in the water industry’s sole remit to resolve.

3 January 2006
Supplementary letter by Thames Water Utilities

Inquiry into Water Management: Water Pressure in London

I was pleased to give evidence on behalf of Thames Water to the Committee on Tuesday 15 November as part of the inquiry into Water Management.

During my appearance, Lord Patel raised concerns relating to water pressure in London, particularly in relation to tall buildings and fire safety. I thought it would be helpful if I outlined our programme to manage water pressure in London more effectively.

Managing water pressure is a complex process and it is not possible—or indeed appropriate—to deliver a set pressure across the Capital. The vast majority of pressure fluctuations experienced by customers are not as a result of planned work, but due to increased demand, pipe size, bursts, changes in usage patterns and leaks.

Our Network Improvement Programme (NIP) forms part of our plan to manage water resources more sustainably. It is a key component of our leakage reduction strategy by lowering the number of bursts excessively high water pressures can cause. In turn, maintenance requirements are reduced, including the number and frequency of streetworks. The Programme is also designed to deliver a more reliable service for our customers by eliminating “peaks and troughs” in pressures, reducing supply interruptions and enabling us to meet localised demand more effectively. The Programme’s focus is on better management of water pressures across supply zones, not to enable across the board reductions in pressure. It is not our intention to reduce pressure across London to the statutory minimum (1 bar at the main) and the vast majority of properties will remain unaffected.

Our experience in the Woodford Supply Zone (London Boroughs of Enfield, Haringey, Newham and Waltham Forest), where we have conducted a pilot project, has indicated that across London 1000 properties are likely to be affected at a cost of no more than £20 million.

We recognise that some property owners will face significant financial costs and as a result have recently announced that we will contribute 50 per cent of the costs of designing and installing booster pumps in those buildings where pressure is directly impacted by the NIP. This contribution, whilst not a regulatory obligation, reflects the shared responsibility for maintaining water supplies which exists between property owners and ourselves. We have also recently agreed to loan the remaining 50 per cent, to be repaid within a period of five years. This acknowledges the financial constraints under which the London Boroughs in particular are operating and allows them to factor costs into their budgetary cycles.

In relation to fire safety, the safety of the public is non negotiable and we are working closely with the London Fire Brigade and London Boroughs to ensure that this is not put at risk.

Only one type of sprinkler system, called a Wet Riser, relies on pressurised water being supplied to a building. As long as this system is designed to operate to the water industry standard guaranteed minimum pressure of 1 bar at the boundary of the building, the system will continue to operate effectively. In normal operating conditions, pressure will not fall below regulatory minimums. To make sure that owners of buildings containing Wet Risers are aware of changes in water pressure as part of the NIP, we are writing to all commercial building owners and continue to liaise with the London Fire Brigade and the London Boroughs.

The flow from a fire hydrant will not reduce. We have been liaising with the London Fire Brigade and Emergency Planning Authority and they have confirmed that we will still be supplying sufficient pressure for hydrants. In the case of large fires, the changes we propose should improve our ability to meet higher than normal demand by transferring water between different London supply zones when required. I hope this provides clarification of our position.

24 November 2005
EXECUTIVE SUMMARY

Water is critical to human life. It is essential to ensure that we have a continued supply to meet future needs. This memorandum for the House of Lords Science and Technology Select Committee sets out the joint views of the Department for Environment, Food and Rural Affairs (Defra) and the Office of the Deputy Prime Minister (ODPM) with regard to the water resources planning framework in England and Wales.

The Government is confident that the current water resource planning framework is sufficiently robust to forecast the future demands for water and to manage the supply–demand balance.

The existing water resource framework consists of an interrelated set of relationships, obligations and statutory rules geared to the objective of ensuring that adequate water supply is provided. The framework itself is designed to provide both short term (up to 5 years) and long term planning (5–25 years) for future water needs which takes into account climate and demographic change and the essential need for new housing, within the context of the five yearly water resource planning cycle and annual reviews of the supply–demand balance.

Increasing pressure on water supplies requires all parties to keep under review existing mechanisms to ensure that adequate headroom of supply over demand is maintained. Progressively, the focus will be on more sustainable mechanisms for ensuring water supply is able to meet demand, rather than relying on building new infrastructure. Where new infrastructure is required, it is vital that environmental and social impacts are understood, assessed and mitigated against.

The Government also expects that the adoption of new technologies and innovative research will play a key role in managing water demand in the future. Improvements in building standards and a more pro-active planning system will also enable us to accommodate demand for water in the most responsive way. The increased use of improved water efficient processes and appliances and innovative demonstration projects, such as those in the Thames Gateway, will show how water demand can be reduced and better managed. More generally, opportunities to influence behavioural change to reduce water wastage will be pursued by Government in collaboration with communities, industry and the regulators.

INTRODUCTION

1. This memorandum outlines the UK Government’s policy on the current and future management of water resources in England and Wales. It is a joint memorandum prepared by Defra and the ODPM and reflects shared knowledge and assumptions and an integrated approach to water resource planning.

2. Water is critical to human life. It is essential to ensure that we have both a guaranteed supply and a healthy water environment to meet our needs. We achieve this in the UK through a well-developed water resources planning system that has a number of components.

3. Demand for water is increasing and will continue to increase. The population of England and Wales is increasing; the number of households is increasing, and households are becoming smaller. These changes mean that increased demands are being placed on existing water resources.

4. The Government’s approach to the management of water resources is predicated on the ‘twin track’ approach of managing demand and developing sustainable resources where needed.
5. One solution to growing demand may be to build new water supply infrastructure, such as reservoirs. However, such large-scale developments come with significant social, environmental and economic implications, and therefore proposals need to be carefully considered.

6. Long-term planning and shared responsibilities require a partnership which includes the Government, the water regulator, the water companies and communities working together. This is crucial to ensuring we are able to provide the supply to meet the demand for water, both now and in the future. That partnership is described in the following paragraphs.

THE ROLE OF DEFRA IN WATER RESOURCE PLANNING

7. Defra was set up in June 2001 to drive forward the Government’s objective of sustainable development. It works to protect the essentials of life: air, land, water and food.

8. Defra sets policies relating to water management, within the regulatory framework set by Parliament, and informs the privatised water companies and the regulators of a wide range of relevant policies, legal requirements and standards that affect the water industry.

THE ROLE OF ODPM IN WATER RESOURCE PLANNING

9. The ODPM’s task is to create prosperous, inclusive and sustainable communities for the 21st century, places where people want to live and work, that promote opportunity and a better quality of life for all.

10. The supply and management of water resources are crucial to delivering genuinely sustainable communities. The ODPM is therefore working closely with Defra, the Environment Agency, the water companies and OFWAT to ensure that demand is being managed effectively, and that new and sustainable resources are being developed where needed. ODPM has a role in managing demand through water efficiency measures, for example through Building Regulations and the Code for Sustainable Buildings. In addition, ODPM aims to ensure that future household numbers and locations are fed into the water resource and wastewater infrastructure planning process as early as possible, and so to avoid significant new development where the supply-demand balance would be compromised.

THE ROLE OF THE ENVIRONMENT AGENCY IN WATER RESOURCES PLANNING

11. The Environment Agency is the statutory body with a duty to manage water resources in England and Wales. The principal mechanism for achieving sustainable management and development of water resources is through the Agency’s system of abstraction licensing.

12. The Environment Agency has developed national and regional water resource strategies that anticipate the pressures on water resources to 2025 and how the Agency will manage them. The strategy, Water Resources for the Future (March 2001), considers the future need for water for both the environment and for society, and assesses the uncertainty about future water demand and availability. The national strategy is complemented by strategies for each of the seven Environment Agency regions and Environment Agency Wales.

13. The Agency also advises Ministers on the adequacy of water resource planning by the water companies.

THE ROLE OF WATER COMPANIES IN WATER RESOURCES PLANNING

14. Water companies are under a statutory duty to supply sufficient water to meet domestic demands, whether from new or existing customers. To help them fulfil this duty, water companies set out 25 year water resource plans, complementing the Environment Agency strategies that describe how each company aims to achieve a sustainable supply-demand balance for the public water supply.

15. Water resource plans are not static; they are intended to evolve in response to the implications not only of climate change, but also to demographic change and increasing pressures for housing. The plans, which are currently voluntary, may include recommendations for development of new resources, such as reservoirs or de-salination plants, as necessary.

16. From 2006–07, as a result of the Water Act 2003, water companies will be placed under a duty to produce and maintain such plans. The draft plans will be sent to the Secretary of State for Environment, Food and Rural Affairs for consideration and will be the subject of consultation.
17. The companies also maintain drought plans that set out how they will continue to meet their duties to supply adequate quantities of drinking water during drought periods. The plans contain a series of triggers that cause the company to initiate a range of actions. The measures activated depend on the severity of the drought. Since 1 October the companies have had a statutory duty to produce and maintain drought plans, and will be submitting their next set of draft plans to the Secretary of State in early 2006. The plans will be subject to consultation.

18. Water companies are also under a duty to promote the efficient use of water to their customers. To fulfil this duty they undertake a range of activities such as repairs to domestic supply pipes, distribution and promotion of water efficient devices, household water audits and to provide information on ways in which households can use water wisely.

WORKING TOGETHER TO MANAGE DEMAND AND DELIVER SUPPLY

19. Defra, the ODPM, the Environment Agency, OFWAT and Water UK are therefore working closely to manage demand for water and to ensure that supply is delivered where it is needed.

20. The Government’s main policy objectives for public water supply were set out in its guidance on the 2004 price review.3 Water companies are expected to reach and maintain an adequate security of supply for their customers by planning to have sufficient headroom (i.e. an adequate margin of supply over demand). During drought conditions, when water is scarce, companies are expected to put measures in place (such as hosepipe bans) to require customers to reduce their demand for non-essential uses. This helps to protect the environment against the impact of water companies meeting unconstrained demand under any circumstances. This also protects customers from the higher bills that such policies would entail.

21. The Government recognises the importance of identifying and resolving environmental problems at major sites at the earliest possible stage. To this end we have concluded a Concordat with the Environment Agency which flags up areas of concern with Ministers at an early stage of the process via early warning system. In addition under the terms of the Concordat we have involved the Environment Agency, as the Government’s independent adviser on environmental matters, in the appraisal of projects for capital funding in the growth areas to ensure that advice on the environmental implications are available from the outset.

Q1: What are the causes of the current problems of water supply, and how serious are they?

22. The issue of water supply cannot be addressed in isolation: in their forward planning, the water companies look at both the supply side and demand side to derive forecasts of future supply-demand balance.

23. The current period of drought is not yet considered to be serious despite one of the driest autumns and winters on record, and the water companies are acting upon their drought plans as necessary. The water resource situation varies from region to region, and the water companies have adequate water supplies to meet demand. Even in the south east where reservoir and groundwater levels have been falling, water companies are confident they can meet demand in the short term. To conserve water, the south east water companies have imposed some restrictions on non-essential use and a small number have been granted drought orders or permits. If the dry weather persists then companies may need to take further action to reduce demand in accordance with their drought plans.

24. The water companies produced a new set of water resource plans in early 2004 that looked at both the short (2005–10) and longer term (to 2030). The Environment Agency reviewed those plans and reported to Ministers4 that all the water companies of England and Wales had produced plans that will allow them to manage supplies for the next five or more years. The Environment Agency is charged with reviewing these plans annually as part of the five yearly cycle.

25. The system for water resources planning provides an opportunity for the water companies to identify longer-term trends (ie 5–20 years forward) and to take pre-emptive action to deal with potential supply-demand imbalances. The Government is, therefore, confident that the system for water resources planning that it has put in place will ensure that water supply continues to meet demand over the longer term.


Q2: What are the projections for future water supply, and what factors will influence these projections? Where, and over what timescales, may problems emerge

26. Almost all water companies in England and Wales predict an increase in total demand for water over the next 25 years. Leakage is expected to remain constant or decline slightly as companies reach the economic level for leakage reduction; non-household demand is expected to fall with changing practices and household demand is expected to increase due to predominately demographic change. Household demand is therefore considered to be the primary driver of the long-term water resource plans of many water companies.

27. There are four key factors that will influence future demand for water:
   — Climate change;
   — Demographic change;
   — Demand for more homes;
   — Trends in household consumption.

CLIMATE CHANGE

28. The Earth’s climate is changing. Global atmospheric temperatures have risen by about 0.7 °C over the last century, and the last decade appears to have been the warmest in the last millennium. The UK’s climate has followed the global trend. Central England temperatures have risen by almost 1 °C over the last century.

29. As global greenhouse gas emissions continue to increase throughout the 21st century, the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) also suggests that global temperatures will rise by between 1.4 to 5.8 °C, and global mean sea levels by 9 to 88 cm, by 2100.

30. Defra funded the development of climate change scenarios for the UK, based on climate modelling carried out by the Hadley Centre for Climate Prediction and Research. These scenarios (referred to hereafter as UKCIP02 scenarios) were produced in 2002; they suggest:
   — Average annual temperatures across the UK may rise by between 2° and 3.5° C by the 2080s;
   — High summer temperatures will become more frequent and very cold winters will become increasingly rare;
   — Winters will also become wetter and summers may become drier across all of the UK;
   — Heavy winter precipitation will become more frequent, while the amount of snow could decline by 60—90 per cent by the 2080s;
   — Extreme high water levels, which currently have a 2 per cent annual probability of occurring, could become 10 to 20 times more frequent at some east coast locations by the 2080s.

31. Over the next two to three years the information from these climate change scenarios will be revised and expanded to take account of the latest developments in the science and to meet stakeholder needs.

32. Through the UK Climate Impacts Programme (UKCIP), we are also building a picture of what climate change means for the UK. Some key impacts relating to water policies could include:
   — Increased occurrence of low flow and worsening water quality in UK rivers due to lower summer rainfall coupled with warmer temperatures;
   — Greater challenges for water supply due to increased water demand and more frequent droughts;
   — Greater climate risks for UK businesses (including the insurance industry) due to increased weather variability, with the possibility of transport disruption and damage to buildings; warmer, drier and sunnier summers could benefit domestic summer tourism.

33. UK regional climate models show considerable reductions in summer rainfall, particularly in the south (20 per cent to 50 per cent depending on low or high global emissions). However, an increased winter rainfall resulting in annual total being only slightly smaller than the present day offsets this. This would require greater reservoir capacity to enable the winter rainfall to be used in summer. These projections are based on modelling studies that contain inherent uncertainties, meaning that the actual seasonal rainfall decreases or increases that will be experienced in future may be more or less than these estimates.

Demographic Change

34. In the UK, population growth is having an impact on demand for water. The UK population grew by 281,000 people in the year to mid-2004 and has increased by 7 per cent since 1971. In parallel with population growth, the average household size is falling. The average size of household, which has dropped from 2.86 people in 1971 to 2.34 people in 2001, is projected to continue to fall and reach 2.14 people per household by 2021.

35. Critically, ODPM statistics also show that the number of households in England is projected to grow from 20.75 million in 2001 to 24.5 million by 2021, an increase of 3.75 million, or 18 per cent. The biggest increase is in the number of one person households which is projected to grow by 2.5 million, from 6.2 million in 2001 to 8.7 million by 2021, 67 per cent of the total increase in the number of households.

36. Although the numbers of households in all English regions are projected to increase over the period 2001 to 2021, the size of the increases varies across England. London, the South East, East of England and the South West are all projected to have around 20 per cent more households in 2021 than in 2001. The North East has the lowest projected growth of just 6 per cent. Further information can be found in the housing section of the ODPM website.

37. Household growth, which is driving demand for additional housing, is the result of three main factors: first, an ageing population (with a declining proportion of the population aged under 16 and an increasing proportion aged 65 and over); second, cultural trends which encourage people to marry and start a family later in life; and third, an increase in the divorce rate. This results in more people living on their own for longer. Rising household numbers are therefore contributing to growing demand for water, with single person households using more water proportionately than homes in multiple occupation.

Household Consumption

38. Most water companies also forecast an increase in the demand for household water over the next 25 years. This is a result of changes in lifestyle and personal water use, for example the more frequent use of showers.

Demand For More Houses

39. The growing population and increasing numbers of households have not been matched by equivalent house building. Supply has lagged far behind demand. Over the last 30 years house building rates have dropped by 50 per cent whereas over the same period demand for new homes has increased by 30 per cent. In the wider South East, 500,000 new households formed in the last 5 years in the regions, but only 350,000 new homes were constructed.

40. Housing shortages and rising house prices are damaging the economic and social well being and future prospects of the country and contributing to problems of homelessness and exclusion. More housing is needed to meet future social and economic needs.

41. In response to these needs the Government set out its proposals to build an additional 1.1 million homes between 2002 and 2016 in the wider South East in the Sustainable Communities Plan. This means creating sustainable communities while protecting and enhancing the environment. A precondition of this is the need to work closely with Defra, EA, OFWAT and the water companies to ensure that as much detail as possible on anticipated household numbers and locations are built into the water resource and waste water infrastructure planning process as early as possible.

Q3: Is sufficient research being devoted to predicting, and handling, possible future scenarios?

42. Research and innovation programmes are an important element of the water resources framework as they provide the data, scenarios and often solutions to managing the competing demands for water. Both Defra and ODPM have active research programmes which form the basis of innovative programmes.

43. For example, the Foresight scenarios for future societal development underpin the Environment Agency’s water resources strategy. Future demand from households, industry and commerce and agriculture has been projected regionally against each of the four Foresight scenarios.

44. The water industry research body, UKWIR, is also undertaking a range of research projects to establish best practice in design of water efficiency trials and determine the cost effectiveness and sustainability of measures.
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THE MARKET TRANSFORMATION PROGRAMME (MTP)

45. One of Defra’s key tools in predicting future trends for domestic water use is the Market Transformation Programme (MTP). They present scenario data on future water consumption until 2025 for around 6 of the largest water using domestic products. These include:

— Reference scenarios: estimating the aggregate impact of existing policy measures, superimposed on underlying market trends, on the supply, sales and use of products;
— Earliest Best Practice scenarios: indicating what could happen if the market was to take up the most cost effective, identified options;
— Policy scenarios: estimating the effects of an ambitious but feasible programme of policy measures.

46. In the future MTP will be extended to include a wider range of water consuming products in both the domestic and commercial sectors.

CLIMATE CHANGE IMPACT AND ADAPTATION

47. Defra’s Global Atmosphere Division is sponsoring a project to develop practical guidance on how to manage water resources in a changing climate. This project is reviewing the potential impacts of climate change and developing potential adaptation strategies based on case study catchments and water resource zones.

48. The objectives of this project are as follows:

— To assess the impact of climate change on the management of water resource zones, and existing water infrastructure;
— In particular, to examine the effect of realistic scenarios of single extreme events, and combinations of extreme events, on water resources;
— To consider the adequacy of current policy and guidance for managing water resources in the context of climate change;
— To recommend how decision-making and management could be improved.

49. Interim results (using the Hadley Centre regional climate model) and the research completed to date suggest that climate change and socio-economic change will have significant impacts on the water resources available for water supply, agriculture and the environment over the next 30 to 100 years. There will be an increase in severe single season droughts across the UK and an increase in multi-season droughts in England and Wales by the 2050s. The full project results are expected to be available in March/April 2006. The Environment Agency will develop, as necessary, guidance that informs future water company plans on how this is to be accounted for.

50. The water industry has sponsored work to link the effects of climate change on water resources. The Tyndall Centre has developed a procedure to allow strategic assessments of the effects of climate change on river flows and groundwater recharge to be made (using UKCIP02 scenarios).

BUILDING REGULATIONS

51. Research is being undertaken by the Water Research Company on behalf of ODPM to support the review of Part G of the Building Regulations, with a view to including water conservation and future water efficiency. Proposals for the introduction of water conservation into the Building Regulations include the wider, and possibly mandatory, use of water efficient equipment in buildings and a water efficiency-rating scheme that will enable building performance to be measured. There will also be guidance on how special equipment such as water recycling systems might be used to conserve water.

52. There is a further proposal that buildings in areas where water is scarce could be required to have a higher water efficiency rating, through a combination of highly efficient appliances and alternative sources of water, such as water recycling.

FLAGSHIP HOUSING PROJECTS

53. The ODPM has a series of flagship housing projects which aim to demonstrate how water efficiency measures can be integrated into on the ground projects, to enable future developments to benefit from these experiences.

54. For example, in Ashford, the ODPM are funding the Environment Agency to provide, in liaison with relevant organisations, an Integrated Water Management Strategy for the Ashford Growth Area. The Strategy covers water supply, wastewater treatment and flood prevention and alleviation, taking account of the additional housing proposed under the Sustainable Communities Plan. The Strategy was finalised in August and will feed into the current master planning for the future growth of Ashford.

55. Developments in the Thames Gateway are also providing exemplars of sustainable development. For example, the Greenwich Millennium Community has an “excellent” rating under the EcoHomes system and has achieved a 20 per cent reduction in water consumption in the first phase of development of 300 homes by using water efficient devices in the homes. Wastewater and rainwater is recycled for toilet flushing and use in the gardens. The target for this first phase was a 15 per cent reduction. For future phases, water harvesting for irrigation and sustainable drainage systems (SuDS) are being re-evaluated.

56. The Gallions Ecopark in Thamesmead is another development in the Thames Gateway to achieve an “excellent” rating under EcoHomes. The development comprises 39 dwellings made of timber frames with argon double glazing, solar water heating, low flush toilets, spray taps, energy efficient lighting and recycling facilities.

Q4: Is the response of government, the EU, regulators and the industry adequate?

57. Shortly after the Government came to power in 1997, a water summit was held to consider key problems of water resources and supply. A ten-point plan was announced which included a review of the abstraction licensing system, action on leakage control and water efficiency by the water companies, and other measures to improve water management and conservation.

58. This was followed by the publication of the consultation paper Taking Water Responsibly in March 1999, which set out proposals for changes to the water abstraction licensing system and to water company forward planning. These proposals were subsequently contained in the Water Act 2003, which is being implemented.

59. The Government therefore believes that it has put in place a legislative framework that ensures that demand for water supply will continue to be met in the future.

Q5: What are the options for increasing water supply, and what are the arguments for and against?

60. The Government’s twin track approach for water supply requires demand side management options, such as fostering behavioural change, use of new technologies and controlling leakage, to be fully deployed before new supply side measures are adopted.7 Better management of demand will offset the need for increasing supplies, which in turn will help mitigate potential environmental damage and help prevent the increased costs to customers that new resource developments would bring.

LEAKAGE REDUCTION

61. Leakage reduction has helped towards avoiding the need for increases in the water supply in recent years. Following the Water Summit in 1997, the Office of Water Services (Ofwat) has set water companies’ leakage targets to reduce leakage to its economic level. This is the level at which it costs more to reduce leakage further than to produce that water from an alternative source. This approach has delivered significant reductions in leakage since its peak in 1995. Annual reports on progress with leakage reduction, security of supply and activities to promote the efficient use of water by the water industry are available from Ofwat.

62. Target setting on leakage has been informed by the Tripartite Leakage Study, a collaborative project between Defra, Ofwat and the Environment Agency that was published in May 2002. The Study included consideration of a best practice approach for companies’ economic level of leakage calculations, the use of additional Leakage Performance Indicators, and how environmental and social costs can be better incorporated into companies’ leakage analysis.

63. One of the leakage management steps that is commonly adopted is improved pressure management so that the risk of bursts and the amount of water lost from leaks is reduced. Most water companies have a policy to offer free or subsidised repairs to the water supply pipes for which customers are themselves responsible, subject to certain terms and conditions. Supply pipe losses for 2003–04 totalled 1024 Megalitres/day, just under a third of total leakage.

**Increasing the recycling/reuse of water**

64. Systems that harvest rainwater or recycle greywater, for uses such as flushing toilets and garden watering, offer potential to reduce demand on mains water. However there remain issues around the feasibility of such systems, especially the cost effectiveness for individual household applications.

65. These systems are generally more appropriate for hotels, public buildings or estate-sized schemes. As well as the economics, there are also health concerns about the use of water that has not been fully treated. Greywater systems require regular maintenance and if this maintenance is not carried out it will affect system performance and the quality of the water. The current review of the Building Regulations will consider whether it is appropriate to place requirements for these systems in legislation.

**New resource development**

66. In 2004, each water company produced a water resources plan that identified a range of options, each with advantages and disadvantages, for new resource development:

- new or enlarged reservoirs—these are potentially costly and have long lead times but do have amenity and recreational value;
- increased use of river and groundwater abstractions—these are much more rapidly utilised but have potentially significant environmental implications;
- long distance transfers of raw and/or treated water—water is heavy and expensive to move and there are potentially problems of flora and fauna being moved to new habitats (raw water) and mixing of waters of differing chemical characteristics (treated water);
- desalination—this is considered energy intensive and may produce noxious or hazardous wastes;
- aquifer storage and recovery—where partially treated water is injected into an aquifer for retrieval at a later date; suitable aquifers will be needed.

Q6: What are the likely future trends in water demand, and what can be done to manage demand more effectively, and to influence the behaviour of consumers and others?

67. As detailed in the response to Question 2 above, demographic changes, demand for housing and climate change will contribute to increasing demand for water. The Government is responding to this increasing demand through a range of policies and initiatives, detailed below.

**The Planning System**

68. Understanding and planning for future land use growth and change is tightly linked with the capacity to access an appropriate water supply. The planning system plays a critical role in achieving this balance through a statutory system, established by the Town and Country Planning Act 1990 as amended. The Planning System, through both policy in regional and local authority development plans and regulation in development control decisions, provides a positive means of managing and enhancing our environment, whilst at the same time allowing development necessary for our economic and social well-being to take place in an appropriate and sustainable way through a development approvals process.

69. Major changes to the planning system were introduced through the Planning and Compulsory Act 2004 including the introduction of new planning tools and a shift to positive planning that will help deliver communities which are sustainable. The ethos of planning is moving from an emphasis on process and regulation to delivery of outcomes.

70. The planning system operates on the basis that water supply is a significant material consideration in the location of development and the use of land and is an important consideration in both the development of policy and in decision making on individual applications.
LAND-USE POLICY FRAMEWORK

71. There are a number of strategic policy documents that take into consideration water resources.

72. Planning Policy Statement 1: Delivering Sustainable Development (PPS1), published in January 2005, sets out the Government’s overarching policies on the delivery of sustainable development through the planning system. One of the key aims of PPS1 is to promote the prudent use of natural resources, including water. It states that development plan policies should seek to minimize the need to consume new resources by making more efficient use of existing resources.

73. Planning Policy Guidance 3: Housing lists the criteria against which the potential and suitability of land for housing development should be assessed when deciding which sites to allocate for this use, including the physical and environmental constraints on the development of land. It is implicit that all relevant physical considerations, such as water resources, should be taken into account.

74. Regional Spatial Strategies (RSS)—Regional Assemblies across England are now preparing and submitting for public examination new RSS that provide the spatial framework for future growth and change within their areas. In doing so they are required under the Planning and Compulsory Purchase Act 2004 to take into account the policies set out in PPS1 and any other relevant government guidance. This requirement also applies to the Mayor of London in relation to the spatial development strategy for London. RSS provide the opportunity to develop robust, responsive and innovative policies, which will make a significant contribution to the sustainable management of water resources at the regional level by ranging more broadly than the former regional planning guidance.

75. Regional Planning Bodies must subject their draft RSS to Sustainability Appraisals (SA), to demonstrate how environmental and resource matters, including water supply, have been taken into account. ODPM issued draft guidance on SA in September 2004, and the final version is due to be issued in late October 2005. The guidance shows how authorities can obtain and use information on water, in order to assess whether the draft policies will promote sustainability, and decide what if any mitigation measures might be needed. SA fully incorporates the requirements of European Directive 2001/42/EC on Strategic Environmental Assessment Directive.

STATUTORY PLANNING FRAMEWORK

76. The statutory planning framework provides the mechanism for decision making against the agreed strategic plans on individual development proposals.

77. In considering water resources, the creation of new water resources would need to be considered on an individual basis and be subjected to the rigorous development approval process. It is also important to note that the statutory planning framework provides a second function, which ensures that the impact of any new developments on existing water infrastructure is considered and where necessary against as part of the decision making process.

BUILDING REGULATIONS

78. Building regulations can play an important role in managing demand through water efficiency measures. There are powers in both the Building Act 1984 and the Water Industry Act 1991 to deal with preventing waste, undue consumption, misuse or contamination of water. Traditionally these requirements were dealt with by Water Bylaws and more recently the Water Supply (Water Fittings) Regulations 1999. However, these Regulations only deal with waste and the profligate use of water; there are not any requirements for using less water.

79. Following the Better Building Summit it was decided that water conservation should be pursued through the Building Regulations. Part G, Hygiene, of the Building Regulations already deals with appliances that use water in buildings so is a natural home for possible guidance on using water conservation. Part G is currently under review and the means of bringing water conservation into the Building Regulations is being examined. Please see paragraphs 52–53 above for further detail.

80. The key proposal for water saving is to make dual or reduced flush toilets mandatory rather than optional. This could save about 20 litres per household, a reduction of over 15 per cent of per capita consumption (pcc). This is two thirds of the target reduction mentioned at the Better Building Summit (25 per cent) or half the best practice saving (30 per cent). The Building Regulations will also consider what role recycled/reused water can play in reducing the demand for mains water.
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The Code for Sustainable Buildings

81. The Code for Sustainable Buildings is a voluntary initiative being developed by Government and industry to improve the resource efficiency performance of new buildings, including water efficiency. It will consist of clear, simple and precise performance based compliance criteria, and will cover a wide range of themes. The ODPM will issue a formal consultation paper later this year (November 2005).

82. The Code will consist of a series of performance levels, and set out clearly specified minimum performance levels for resource efficiency, including water. The efficient use of water will be expressed in terms of pcc. Currently the average pcc in England and Wales is approximately 155 litres per head per day.

83. From April 2006, all new homes receiving Government funding, including those in the Thames Gateway and the growth areas, will meet the requirements of the Code for Sustainable Buildings.

Influencing behaviour

84. The savings in individual households will depend on the behaviour of the occupants. A new water efficient house with inefficient occupants may have a far higher overall consumption than a standard house with a water aware family. For example, the total water used for a shower depends on the flow rates (technology) and the duration (habit). A 12 litre per minute “power shower” taken for 30 minutes will use 360 litres of water—as much as four baths. One of the challenges is to ensure that water efficient fittings and appliances perform as well as standard fittings, otherwise householders are unlikely to retain them.

85. The extent of measures that water companies undertake to promote water efficiency varies according to their water resource position. It is reasonable to expect water companies in water stressed areas to have a more comprehensive programme of measures. Most water companies provide a water audits service to their customers, this identifies areas where water savings can be made from making better use of the water supplied to them, fixing leaks and using water efficient technologies to reduce the amount of water used.

86. The use of technology has an important role in reducing the amount of water used. For example, installing a low flush toilet in a house reduces the amount of water used without any change of behaviour being required. Government is currently considering an “Environment Direct” service for the general public to be set up, to offer information about the environmental impact of goods and services, including advice on water efficiency.

87. The Government is considering a report from the Environment Agency on possible models for the operation and funding of a water savings trust. Defra are also taking forward other options for improving the contribution that water efficiency can make to meeting the supply-demand balance. Over the coming months we will be working closely with Ofwat, the Environment Agency and other stakeholders to consider options for increasing the level of water efficiency measures particularly in water scarce areas.

88. An industry-led initiative, Waterwise, launched on 1 September 2005 will promote water efficiency and co-ordinate research by water companies. Waterwise aims to reverse the trend of increased demand for water within five years.

Role of Metering

89. The percentage of domestic households that are billed on a metered basis has risen from an average 8 per cent in 1996–97 to 24 per cent in 2003–04. Water companies have plans for household metering to increase to an average of 39 per cent by 2010 and 66 per cent by 2030. Within this average there is considerable variation across individual water companies with three companies already having more than half their domestic customers metered in 2003-04.

90. Metering provides a financial incentive to individuals to save water. On average metering can result in reductions of about 10 per cent in water consumption but the actual figure will vary greatly depending on individual circumstances and the structure of tariffs.

Q7: What contribution can science, engineering and technology make towards reducing water use or waste by households, businesses and the public sector?

91. Science, engineering and technology are already making an important contribution to helping reduce water use and waste, and will continue to do so. This is clearly shown in the evidence provided in answer to the questions on research into future scenarios, options to increase the water supply and management of demand for water.
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92. Some manufacturers already design and market their products on the basis of water efficiency. This is something the Government would like to see more widely replicated. The Market Transformation Programme (MTP) is defining performance standards and benchmarks for a range of water using products, which will inform the consideration of new regulatory requirements and the feasibility of introducing a voluntary labelling scheme to promote the most efficient products. An effective scheme should stimulate manufacturers to produce products that are more water efficient and promote the uptake of innovative technologies.

93. For businesses, the Enhanced Capital Allowance scheme for Water Technologies was launched in 2003 to provide tax incentives for those investing in designated technologies that save water and improve water quality. There are currently nine technology categories within the scheme:

- efficient taps;
- efficient toilets;
- flow controllers;
- leakage detection equipment;
- meters and monitoring equipment;
- rainwater harvesting equipment;
- cleaning in place equipment;
- efficient membrane filtration systems for the treatment of wastewater for recovery and reuse;
- efficient showers.

94. Envirowise is a programme run by Defra and the DTI to provide practical environmental advice to businesses on a range of issues, including water and waste minimisation and Environmental Management Systems. Industries are supported through free publications, events, seminars, and collaborative work with industry bodies, tools and clubs.

95. Watermark was established in 1999 to develop benchmarking and management information on water consumption across the public sector as a means to improve water efficiency and reduce costs.

96. The Framework for Sustainable Development on the Government Estate was published in July 2002 and focuses on the key sustainable development impacts of the Government Estate. It includes a part for water targets to reduce water consumption. This approach, agreed by all central Departments, is the main vehicle for systematically assessing, managing, reporting and improving the performance of the Government Estate.

Q8: What is the current state of the water supply and drainage infrastructure? Is there sufficient investment in its improvement?

97. Ofwat holds the information on the current state of the water supply infrastructure. Accordingly, Ofwat have submitted a separate Memorandum to the Committee that includes a section on this issue.

98. The Government is currently reviewing the issue of private sewers and drains. The responsibility to maintain the private infrastructure of sewers and drains currently rests with individual property owners. The majority of respondents to a recent consultation favoured transferring ownership of private sewers and lateral drains to sewerage undertakers. The Government intends to publish a decision paper later this year.

Q9: The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at national and European levels, adequate?

99. The water resources aspects of the Water Act 2003 cover several areas: reforms to the abstraction licensing system to bring all significant abstractions into the regime;

- reforms to the impoundment licensing system, such that these must be licensed throughout their lifetime, or where not presently licensed can be required to be licensed;
- introduction of the new duties of water companies to plan for water resources and drought, introducing consultation into these processes;
- introduction of new water conservation duties on all public bodies, the Secretary of State, and the water companies.

8 www.eca-water.gov.uk
9 www.envirowise.gov.uk
10 www.watermark.gov.uk
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100. The provisions of the Act are being implemented progressively and significant benefits to water resources management and planning will be realised over the next 5–10 years. They also help to deliver the requirements of the Water Framework Directive.

Q10: How does water figure in the development of government policy areas such as housing, land use planning and industry?

101. Water management is crucial to housing, planning and building regulations policy, both for existing housing and new housing developments, such as those in the growth areas and the Thames Gateway. Details of the range of programmes and policies that the ODPM has in place to ensure that water is considered during planning processes, in housing developments and in new buildings are set out in paragraph 67–83 above.

102. Also, the Sustainable Communities Plan identified the growth areas in the south east which are expected to provide an additional 200,000 homes above those already identified in RPG. Within each growth area, Local Delivery Vehicles have been established to co-ordinate the activities of stakeholders and partners. This will ensure that the new homes are located where they are needed and that the services to support them are provided.

103. In considering the needs of future water resources it is important that the water companies liaise closely with local planning authorities and local delivery vehicles in the growth areas. This will ensure that water companies know about, understand and can plan ahead for the provision of water to new developments. In turn, the local planning and delivery vehicles can be fully aware of potential major issues that the water companies need to address in planning for future supply.

104. As detailed in paragraphs 16 above, water companies are already planning new house building into their water resources plans, using projections from ODPM and local authorities.

Q11: What can the UK learn from the experience of other countries?

105. In order to deliver sustainable water services in the UK, the UK-based water industry has been developing integrated water management skills for 30 years and successfully works in partnership with the Government. The resulting performance of the entire UK based water industry is, in world terms, excellent; drinking water quality is the highest it has ever been, river water quality has improved dramatically and coastal bathing water quality improves year on year.

106. Although the UK has made important advances in water resources management it can still learn from the experiences of other countries. Research is being undertaken in order to compare the usefulness of water saving practices in other countries, the effects of reduced flows on the functioning of sewers, users’ acceptance of recycled water and lower water use appliances.

107. For example, in the State of Victoria, Australia, the Government has successfully implemented a range of new measures aimed at reducing demand for water, this has included a significant media and publicity campaign raising awareness of water demand issues, the introduction of permanent water restrictions, a water smart gardens and homes rebates scheme and a smarter water pricing system that encourages households to save rather than waste water. In the urban centre of Melbourne it is estimated that water savings of 19 per cent per person has been achieved in 2004 compared to the average in the 1990s.

October 2005

Examination of Witnesses

Witnesses: Mr Richard Bird, Head of Water Directorate and Mr Mike Walker, Head of Water Resources Policy, Department for Environment, Food and Rural Affairs (Defra), and Mr Andrew Wells, Director of Sustainable Communities and Mr Lester Hicks, Head of Minerals and Waste Planning Division, Office of the Deputy Prime Minister (ODPM), examined.

Q154 Chairman: May I extend a welcome to our visitors today to the Committee? Would you like to introduce yourselves?

Mr Bird: Thank you very much My Lord Chairman. I am Richard Bird, Head of Water Directorate in Defra.

Mr Wells: I am Andrew Wells; I am Director of Sustainable Communities in the Office of the Deputy Prime Minister.

Mr Hicks: My Lord Chairman I am Lester Hicks; I am Head of Minerals and Waste Division in the Planning Directorate of ODPM and “minerals and
Waste” in this context covers the natural environment, so I am responsible for aspects of the water environment in planning.

Mr Walker: My Lord Chairman I am Mike Walker, Head of Water Resources Policy at Defra.

Q155 Chairman: Is there anything anyone would like to say by way of preparatory remarks, or would you like us to go straight into the questions that we have in mind.

Mr Bird: We are very happy to go straight to the questions, if that is convenient to the Committee.

Q156 Chairman: I should like to start by noting that we have two different government departments here, Defra and the Office of the Deputy Prime Minister. Could you give us some idea of how you communicate on water issues, who leads at these meetings, how often you meet, if you do have regular meetings?

Mr Wells: In relation to my own area, that is sustainable communities, at the top level there is a new Cabinet committee, the new Housing and Planning committee, on which both our Cabinet level ministers sit under the Prime Minister’s chairmanship. To support that, there is an official committee, HPO, in which officials meet, again including both departments, under a Cabinet Office chairman. Both of those meet as and when they are needed. We also lead our own committee, the inter-departmental officials group on sustainable communities; we chair that and Defra attend. That meets roughly every two months at present. We also have a regular liaison meeting with the Environment Agency to discuss any issues as they arise, but particularly water, sewerage and flood defence issues. I understand that a number of other groups deal with issues such as building regulations and there is a Defra led Water Saving Group. Those are the formal things, but, in addition, there is an enormous amount of informal exchange, lots of meetings, for example in preparing the evidence for this Committee and currently in preparing and completing the Government’s response to the Barker report on housing supply. Colleagues from Defra may want to say something about the more specifically water related committees.

Q157 Chairman: Would one of the two from Defra like to add to that?

Mr Bird: May I just say a bit about the Water Saving Group which has recently been set up and I do not think was covered too exhaustively in our memorandum because it is a very new instrument. This is a Defra chaired group but ODPM are very much members of that. The high level group will be meeting every six months, but there will be very regular meetings of the supporting officials group; indeed I chaired the first such meeting a few days ago with ODPM representation. This is just an example of where issues arise we do set up mechanisms involving the two departments and other stakeholders as well. Another group is the forum on the Water Framework Directive where there is a stakeholder forum and ODPM are fully involved in that, as they are indeed in cross-government work in taking the Water Framework Directive forward. There really is a very great deal of contact between the two departments.

Q158 Chairman: What happens when you disagree?

Mr Bird: We have a forum for that debate. Ultimately, if the departments disagree and it goes up the line, then this is a matter which ministers can discuss, either bilaterally or collectively.

Q159 Lord Howie of Troon: I have been wondering for some time who in Government is responsible, has the job of ensuring security of supply, if indeed that is possible?

Mr Bird: Within Government this is primarily a Defra responsibility. We have overall responsibility for the water sector and that includes the very important aspect of water supply. Other government departments have a very important role in that process: ODPM through the sustainable communities programme, the planning system and building regulations. Other government departments have a role to play through water saving on their estates and have to meet targets under the sustainability programme objectives. Overall, Defra is the lead government department on water supplies.

Q160 Lord Howie of Troon: It is Defra.

Mr Bird: It is Defra.

Q161 Lord Howie of Troon: Do you get advice from other people?

Mr Bird: Indeed and of course, in so far as the sustainable communities programme is affecting water supply, then ODPM would lead on that, but with advice from Defra, so it does depend very much on the particular issue in question.

Q162 Lord Howie of Troon: Security of supply depends on it raining from time to time. What about desalination? How far have you got with that? The North Sea is full of water.

Mr Bird: It is and desalination is becoming a fairly well-used technique for water supply. There are many desalination plants in Spain now, for example, where there are more critical water supply issues than in the UK. In our system, it is the water company which will take the lead in bringing forward a proposal. It would
then obviously need to take that through the planning system. The Environment Agency would give advice on that proposal for planning purposes. I should say, in general terms, desalination is now being looked at by water companies but it does have some quite significant disadvantages, particularly high energy use and also the waste aspect as well. So although it clearly does have attractions, there are some downsides.

**Q163 Lord Howie of Troon:** What waste is that?

*Mr Bird:* This would be the salt waste which is generated as part of the desalination process. It has to be disposed of.

**Q164 Lord Howie of Troon:** But in fact, there are no real proposals at the moment.

*Mr Bird:* There is a firm proposal by Thames for a desalination plant in the Thames estuary at Barking and that is currently going through the planning process.

**Q165 Lord Howie of Troon:** But the Mayor of London does not like it, does he?

*Mr Bird:* I understand the Mayor of London has directed the planning authority concerned to turn the proposal down and it is now the subject of an appeal. 

*Lord Howie of Troon:* So nothing very much is happening?

**Q166 Chairman:** There is a South East Water desalination plant too, is there not?

*Mr Walker:* I was about to add that in fact South East Water are constructing one at Newhaven and I believe Thames have a second potentially in their 25-year plans.

**Q167 Lord Howie of Troon:** As a civil engineer, I rather like reservoirs. Have you any firm plans for reservoirs in areas where there is a water shortage such as the South East?

*Mr Bird:* Yes, there are various proposals and these have been picked up in the companies’ long-term water resource plans. None of them are at quite such an advanced stage as the desalination plant proposal. There are no formal planning applications, but the expectation is that one or two of them will start going through planning in the not too distant future. Mike may be able to add a bit to that.

*Mr Walker:* In the water companies’ plans something like five new reservoirs are being proposed, mainly in the South East and possibly one in the upper Thames region, and there are plans to extend or raise a further three.
through regulations and also through the enhanced capital allowance scheme. We also have the market transformation programme which is providing us with some useful scenarios which will help inform voluntary codes on product labelling and equipment supply and demand issues. There is already quite a lot happening, but clearly scope for doing more. As far as the role of water companies is concerned, they do have a firm role in this area. They are charged with water conservation and they need to ensure that there is adequate security of supply; so clearly that involves the twin-track approach, not just addressing the supply side but also the demand side. Ofwat have a role to ensure that water companies do carry out their responsibilities in this area. We think there are appropriate pressures, checks and balances in the system, but we also think that there is more scope through the Water Saving Group to see what further could be done.

Q171 Baroness Sharp of Guildford: Perhaps in that context you could tell us what the present position is in relation to the notion of having a water savings trust which is analogous to the Energy Savings Trust. May I just come back on your answer here? You talked about looking at the key players and routes to reduce future demand. Who do you see as being the key players here? You have talked also about water fittings and changing regulations here. Would not one of the easiest or best ways of actually ensuring water saving be to look at the fitting of water closets in houses and to go for ones which have dual flush and to provide some kind of incentive, just as we have seen incentives for insulation in houses in relation to energy efficiency, some sort of incentive to retro-fit these in older houses?

Mr Bird: On the water saving trust proposal, this has been discussed quite a lot and the Environment Agency have put forward proposals recently. Obviously, the Energy Saving Trust has set a very good lead in this area and it is very tempting to see whether there might be something similar in the water sector. The big difference at the moment is, of course, that, unlike energy, water is only partially metered; only 28 per cent of domestic users are currently metered, so obviously that means there will be less scope for a water saving trust type body at this point. There is the other issue about how such a body would be funded and clearly water prices are a sensitive issue and the regulator is sensitive about any additional pressures on costs in this area. For the time being, the focus is on the Water Saving Group, but it is certainly possible over time that the water saving trust idea might come back; there are no proposals for going in that direction at the moment. On the key players, I think we have mentioned several of them already. Clearly Defra and ODPM in Government, the Environment Agency, Ofwat, the water companies, both through Water UK, the association, but also individual companies who are significantly affected, and the new Consumer Council for Water which has taken up its statutory role from 1 October and will be providing a wider range of consumer focus on these issues than its predecessor non-statutory body, Water Voice, was able to do. In terms of your question about retro-fitting, there is a fair amount that can be done here through regulation and the water fittings regulations are there to deal with new appliances being fitted, so would cover a situation where a new appliance was being fitted in an older property. For newer properties and for extensions, there is the role of building regulations and perhaps I could hand over to my colleague, Andrew Wells on this.

Mr Wells: On the building regulations, there are two possible routes. There are water fittings regulations, which are a Defra responsibility and which reach potentially into more dwellings and more sorts of fittings. Then there are building regulations which are about buildings being built new or very substantially altered and which are more limited and in the sense that they are unlikely to reach appliances and things like dishwashers and washing machines, but they can potentially reach things like showers, baths, toilets and so on. We are doing quite a lot of work on this. We are also doing work on the proposal for a voluntary code for sustainable buildings. This was an idea which came out of the sustainable buildings task force which was set up jointly by the Deputy Prime Minister and the Secretary of State for Environment Food and Rural Affairs. The proposal is essentially for a code which would have a number of aspirational levels above the regulatory level, with the idea to push forward technology and if you can prove that things are workable, practicable and cost-effective, then they could move in time into the regulatory level and you could push the code up to further levels. Ministers are currently putting those ideas together into an environmental package which they will want to announce at the same time as they respond to the Barker Review of Housing Supply and they have said they will do that before the end of the year. So I think when you see Baroness Andrews, which I think is likely to be in the new year, anyway after this announcement, she will be able to give you more details then. I should say that all that is about fixtures and fittings and it is technological, but a lot in this area depends on what people choose to do with the technology you put in their homes. You can put in all the fixtures and fittings you like, but if they use them not quite in the way intended, then you lose the benefit. I think this country has had a previous attempt to use dual flush toilets, for example, and the actual evidence was that without people...
understanding how they work, which button they were meant to push, they sometimes ended up using more water. So you do need to be cautious about purely technological approaches to this. There is a large education and change in behaviour element as well.

Q172 Baroness Sharp of Guildford: Does it not also require a certain amount of push and leadership from Government? Is there really enough urgency behind what you are doing? It seems to me that it is the same players all the time getting around the table and making plans and having aspirations, but actually what is being done, in a fairly serious situation when, given your plans to build another million houses in the South East over the next ten years, we face a very serious water situation. You quite rightly say, yes, demand is the key issue, but are you really providing enough leadership here? It is all, on the whole, aspirational.

Mr Wells: Richard will want to talk about what has been done in the past, but quite a bit has already been done in the last ten years to push up water efficiency; toilet flushes, when I was in one of the water jobs in what is now Defra, were reduced from seven point five to six litres, which is quite a substantial change and will now have had quite a substantial effect on total water use. That is part of the Barker response; ministers are looking at this very seriously and will have a package to come out with alongside the Barker response. I am afraid I cannot, in politeness to them, really tell you what that will be, but it will be out before the end of the year.

Q173 Chairman: This arises from the answer to the question earlier, that Defra accept responsibility for ensuring security of supply. We have three regulators: one of which, Ofwat, deals with water prices and constrains the amount of money that the companies effectively can spend and that is probably the greatest driver in ensuring security of supply. The Environment Agency is there to protect the environment. How can Defra fulfil its role of securing security of supply, if you do not have an income stream?

Mr Bird: The point to underline is that the security of supply responsibility is shared; companies have the fundamental responsibility for security of supply and they have to satisfy the Regulator that they have plans for doing that and results are published annually. Most companies are very much in the secure supply category. At the moment there are two companies, Thames and Folkestone and Dover, where there are issues about security of supply. That is the day-to-day mechanism for addressing these issues. We have the plans, the 25-year plans which the Environment Agency draw together and companies have shorter-term drought plans as well to cope with situation where there is exceptional weather, such as we have been having over the last few months. There is a structure and it has, over the last ten years, generally delivered good results in terms of providing the supply and security of supply to which customers rightly attach enormous importance. Looking ahead, there are issues: climate change, household growth, rising demand. This is why the Water Saving Group has been established, so that there can be a clear commitment to seeing what needs to be done beyond the existing structure. However, we should not minimise what the existing structure has achieved.

Q174 Lord Lewis of Newnham: May I just follow on in a slightly different way? Let us make the assumption that you, for some reason or other, do not get the supply. It seems to me that the one who carries the blame for this is going to be the water company. What do you do about it? Do you fine them?

Mr Walker: In broad terms, the water companies have a general supply duty under the Water Industry Act, which is the primary legislative framework within which they work. Potentially, breaches of those duties can result in some fines, yes. That fine-making capacity was introduced through the Water Bill which became the Water Act 2003; yes, fines can ultimately be levied.

Q175 Lord Lewis of Newnham: It strikes me that under these circumstances we are dealing with a situation where we have three different groups of people who are telling one group of people what it can do and if it does not do it, then they are fining them. This seems to me to be in the extreme, and not the most sensible way of running a system.

Mr Bird: It is right that water companies should have the fundamental responsibility, because they have the practical expertise and the ability to ensure that, using various techniques, supply is assured. I do not think that fundamental responsibility could be given to anybody else. However, it is also important that the other players should be contributing towards that and making it possible for the companies to discharge their responsibilities. It is inevitable, in this sort of situation that we have to proceed in a group fashion, if I might put it that way, with all the players coming together and agreeing on direction and means and so forth. Clearly the water companies are very much part of that process. It would be unsatisfactory if everybody else was agreeing what water companies should do and water companies were not part of that and that is a situation which we obviously want to avoid.
Q176 Lord Howie of Troon: Earlier on I asked who was responsible for security of supply and I think I was told it was Defra. I am now confused: it seems to be Defra but also the water companies. Should we run out of water, who is to blame? Is it Defra or the water companies, or the hand of God, or what?
Mr Bird: I think the question was who in Government was responsible and I said in answer to that question that it was Defra. Certainly, if one is looking at the whole structure of water, then the day-to-day statutory responsibility lies with the individual water companies.

Q177 Baroness Platt of Writtle: What role do you see for water meters and variable tariffs in water management? Should it be easier for water companies to impose compulsory metering in water stressed areas? It really follows on from the last question. I live in Essex, which is dry; just declaring an interest.
Mr Bird: Metering obviously does have a significant role to play in terms of addressing water demand. There is some debate about exactly how much and this is one of the issues that the Water Saving Group will be looking at in more detail, but a figure of round about 10 per cent is generally regarded as the norm for reducing demand when meters are fitted and that is generally sustained over time. A meter clearly does have a role to play and also it opens up possibilities for using tariffs to address demand as well, which can also be part of the solution. Against that, meters are expensive; figures vary from area to area and type of meter to type of meter, but a figure of £200 a meter is often quoted for supplying and fitting. Then there is the responsibility to read and maintain the meter as well, so there are quite significant costs here and those costs are borne by customers. Metering clearly needs to be looked at in terms of the area. There is also, of course, the impact on individual customers and there are some customers who have to use a lot of water for various reasons, who would find the costs quite challenging. These are all factors which are taken into account. The current position is that the Government encourages metering wherever it makes sense. We have seen a very significant increase in metering. It was eight per cent across the board in 1996-97 and in fact the latest figures show that it is now running at 28 per cent in 2005-06, so there has been a significant change over that period and, on companies’ plans, this will increase to 39 per cent in 2010. There is a provision for companies to move to compulsory metering in their areas: the water scarcity status route.

Q178 Baroness Platt of Writtle: How can vulnerable groups and those on low incomes be protected, if compulsory metering threatens to impact adversely on their bills? Just following that up, apparently a billion pounds is owed to service providers in unpaid bills. What can be done, short of bringing back disconnections, to address this problem?
Mr Bird: On vulnerable groups, there are already regulations to protect particular categories of families who have problems through no fault of their own, particularly if there is somebody who is ill and needs a large amount of water for their treatment. We are looking always at whether those regulations remain correct and they have recently been amended following a review last year; the coverage has been slightly extended. That is a specific way in which high metered users are helped and their costs are then brought down to the average for the relevant group of unmetered customers in their area. On the wider question of the uncollected debt, clearly there are different aspects here. There are people who have difficulty in paying and there are people who simply will not pay at all. Companies themselves are developing strategies for distinguishing between those groups, providing help to those who have genuine difficulties through charitable arrangements and so on. I think most, if not all of the water companies have these now and we are encouraging the companies to exchange best practice in this area, and, as far as the other group is concerned, using the normal ways of ensuring that payment is made.

Q179 Baroness Platt of Writtle: Would that be through the courts?
Mr Bird: If necessary, through the courts. There are no plans to bring back disconnections.

Q180 Lord Lewis of Newnham: You talk about metering and in your actual submission you do talk about the situation in the State of Victoria in Australia, where they are involved with smart metering and the effect that this has had. Do you have any intention of going into the smart metering regime?
Mr Bird: This is just the sort of issue that the Water Saving Group will be looking at. Obviously the precondition is to get metering up to an effective level and then options for using different sorts of metering and so on come into play. Certainly we have a very open and enquiring mind on these possibilities.
Q181 Baroness Perry of Southwark: I should like to come back to the Deputy Prime Minister’s housing initiative and its impact on water supply. First of all, did the ODPM involve the water companies in that initiative? Was there any discussion with them beforehand about security of supply for this huge additional tranche of housing? What evidence did ODPM have or seek about available water resources when they were launching the initiative?

Mr Wells: The Sustainable Communities plan was published in February 2003 and it set out a proposal to facilitate an extra 200,000 homes in the wider South East up to 2016; that was on top of what was already in regional plans, which was about 900,000, so it is about 1.1 million homes over that period. The aim in the sustainable communities plan was to see those homes built in London and then in four identified growth areas: the Thames Gateway, Milton Keynes/South Midlands, London/Stansted/Cambridge, and we have added Peterborough since because they wished to come in, and Ashford in Kent. The thing about all those areas is they have quite a long planning history; the Thames Gateway had a very long planning history at that point and had been a major project at least since the early 1980s and actually has a longer history. The other three were all identified in the last regional planning guidance for the South East, RPG9, as areas which could take extra growth because, when that was finalised, there was a debate about the number of homes. Broadly speaking, the Government was for more, to meet the increasing number of households, and some of the local authorities were for fewer. The deal which was done, the settlement, was essentially for a certain number of homes, but looking at these further growth areas. Those were investigated over subsequent years in a series of planning studies and those studies did look at all the constraints and where necessary they looked at water. There was the basis on which we built the Sustainable Communities Plan.

Q182 Baroness Perry of Southwark: Did ODPM talk to the water companies? Did you consult Thames Water, for example, wrestling with the Mayor’s refusal to allow desalination in the Thames? Thames are in deep anxiety about it all.

Mr Wells: I do not know what the timing of that debate is, but in general terms, what we had to build on in the Sustainable Communities Plan was what I described, previous planning studies which had involved, for example in Milton Keynes/South Midlands, consultants going to talk to the water companies and the Environment Agency and concluding in their report that there were water issues, but that they could be solved; they were not insoluble problems. We built on that. Since the Sustainable Communities Plan, there has been a great deal more detailed work on these specific locations. None of the sustainable communities plans set particular numbers in concrete. What we had then to do was to get those numbers built into the regional spatial strategies. What we have been doing, in Milton Keynes/South Midlands, for example, has been to put a sub-regional proposal through examination in public where all these issues get aired in front of a panel of inspectors and then they produce a report. That has been done there and it has been done in Ashford and in relation to London/Stansted/Cambridge/Peterborough that process is going on at the moment in the examination in public of the new regional spatial strategy for the East of England, RSS14. All these issues are getting exhaustively discussed. There are at least two further stages: one is doing development plans, and the water companies and the Environment Agency are statutory consultees in producing those at individual authority level. Then there is the level of working on individual locations and in each of the locations like Ashford, like Milton Keynes, we have a delivery vehicle which can be a local authority partnership, or in some cases an urban development corporation, and those delivery vehicles are working very closely with both the Agency and with the water companies to solve the particular problems of the area, be they water supply or sewerage or flood defence, those sorts of things. There is an awful lot of work going on at the local level on these issues.

Q183 Baroness Perry of Southwark: What you are saying is that at the moment you are satisfied that the water companies are involved in the planning stages, but before the plan was launched you relied on the development plans which had already been put forward.

Mr Wells: When the Sustainable Communities Plan was launched, we were relying on the planning studies which had been done since RPG9 was settled in 2001. Since then, there has been an awful lot of engagement, and that is the statutory process: to get those numbers put into regional spatial strategies and then development plans and indeed make them a reality on the ground. We funded quite a lot of work in various locations, particularly an integrated water management study in Ashford, which is obviously in the South East and one of the more stressed water locations.

Q184 Baroness Perry of Southwark: If the desalination plant were not to receive planning permission, would that seriously damage your plans for development in the London area?

Mr Wells: We come back to Richard’s answers. The companies have an obligation to supply and then all of us have an obligation to work with them to work
out how to supply: a desalination plant is no doubt one option, but there are other options. The approach we set out in our evidence is that first of all we look at what we can do through water saving and efficiency and then we will look at additional supply in whatever form. I am afraid I do not know the specific issues of the desalination plant in the Thames estuary.

**Q185 Baroness Platt of Writtle:** This is rather near home, I have to say. On the M11 development, locally it is thought that nobody had consulted the water companies and it is the driest area. The county council brought in the Ely/Ouse scheme, but that is only local. You say you fine a water company, but Anglian Water have been very good on metering and all sorts of things, because they are so aware of the dryness of that area. It seems to me, before building a whole lot of new housing, that does need to be thought out.

*Mr Wells:* This is subject to examination in public at the moment.

**Q186 Baroness Platt of Writtle:** So are you saying that the decision is not final yet?

*Mr Wells:* It is not final, and it is subject to evidence on the water effect. I have had a presentation from the Environment Agency on exactly these issues, of the implications of the development proposed in that area for the water infrastructure, both water supply and sewage, the disposal of waste water. Work is going on and it will be in front of that examination in public and the inspector will have to look at it.

*Baroness Platt of Writtle:* I am very glad to hear it; thank you.

**Q187 Lord Howie of Troon:** As I recall it, and you will correct me if I am wrong, some years ago Professor Crow reported that there should be one million or so houses in the South East. I have forgotten the precise number. The local authorities and such people objected to this and the Office of the Deputy Prime Minister reduced the number. What he did in fact was to split the difference between what the local authorities wanted and what Professor Crow wanted. We are now back to Professor Crow’s figures. Does this fluctuation in the apparent demand for housing cause confusion in your water supply planning?

*Mr Wells:* May I just talk about the figures? That is what I was describing. Crow, as a planning inspector, recommended that number in RPG9 and the eventual settlement of that was below his proposal. Part of that deal was also that there should be investigation of Milton Keynes/South Midlands, London/Stansted/Cambridge/Peterborough and Ashford as potential locations for more housing and that is what has now come to fruition.

**Q188 Lord Howie of Troon:** Back to Crow’s figures.

*Mr Wells:* Indeed. I am not an expert on the exact figures, but I believe that it is not too far from his original figure, if you add in that 200,000. The reason for this is because of the growth of households in the South East.

**Q189 Lord Howie of Troon:** Has that fluctuation caused you problems?

*Mr Bird:* This is probably a question you will have to put to the water companies. Certainly the impression we get is that they are very well plugged into the planning process. There is flexibility in their planning, so they can take account of adjustments when they occur.

**Q190 Lord Mitchell:** On the planning process itself, could you tell me what you are doing to ensure that water and the water industry have a more central role in the planning process from the outset?

*Mr Hicks:* It is and has always been the case that water resources are a material consideration in the planning process. Therefore it has been there, and was there way back, in the previous structure plans, and in the regional planning guidance. There is nothing new here. We are talking perhaps about an increase in demand because of planned growth, but the system has been there for some time, for water resources to be taken into account in the planning system. That is deeply embedded in a wide range of the policies and guidance we have set out over the years. The planning system is designed to aid the delivery of sustainable communities by ensuring that water supply issues, and not just supply issues but the effect of development on water quality, flood risk and flood management, are all considered in the planning process at the various levels, down to the regional level through to local authority level and then individually when we look at individual applications. The water companies are already statutory consultees for regional plans and local development documents, what used to be the old local plans, because the water resource issues are important. The Environment Agency is also a statutory consultee. The bodies are there to be consulted when plans are drawn up. We have a plan-led system under which planning applications have to be determined in accordance with the plan, unless material considerations indicate otherwise. Once you have a plan in place and it has been adopted it has great weight in the system in determining the pattern and location and form of development. If, for example,
water system implications, that has to be tested and examined very carefully at the individual site level. We think that the major players in the water system, the Environment Agency but also the companies, are and should be fully integrated in the plan-making process. This is not new; it has been going on for some time. If we thought that was not the case and, for example, that we needed to do more, we should consider it. But I would caution against going further, for example making the water industry a consultee at the individual planning application stage. At the individual application stage, they would be swamped with about half a million applications a year, which would not be an effective use of time in focusing on where the real issues are. Around all this, in the planning system, we are doing a lot more. It is probably not the centre of your focus today, but we are doing a lot on flooding, for example, on flood risk. That has been a big driver for us in recent years. Currently, because we now have the Water Act and now the new Water Framework Directive, which are going to require the preparation of river basin management plans, which Richard’s directorate is operating, we are getting alongside Richard’s people and the Environment Agency to understand what these river basin management plans will mean for spatial planning. River basin management plans will be partly about an overview of resources and abstraction.

Q191 Chairman: I am sorry to interrupt, but let us go onto that when we talk about the Water Framework Directive and stick on planning for the moment. Mr Hicks: It is a planning matter. What we need to do is understand what the Water Framework Directive will require of the planning system. What will the requirements of river basin management plans actually mean in terms of the way we shape planning policy, the way we influence water quality, the way we influence abstraction? That is work we are now starting to do, building on the other work we have done.

Q192 Lord Broers: I should like to return to the regulations about water saving devices. Mr Wells, you were talking about the regulations before and saying that they are largely voluntary. Why are they voluntary? I know places in the United States, for example, where not only new construction has to use double-flush toilets and special showerheads, but it is compulsory for existing units to be replaced.

Mr Wells: I am sorry; I certainly did not mean to imply they were voluntary. The distinction I was trying to make was between getting people to fit them, which you can do; obviously you can have regulatory systems, certainly on new houses you could have those through regulations and in relation to older houses when things are changed you could do that through water fittings regulations. That would be compulsory. What I was trying to say was that the use of those things is a matter of people’s behaviour and people can use them in ways which, even if they are designed to use less water, will actually use more. You can put showers into dwellings with the theory that is going to make people use less water, but if they install power showers and they use them for a very long time, they can actually end up using more water. If they have dual-flush toilets and they use them incorrectly, so they often end up double-flushing them, flushing them twice, then they can end up using more. There is a large behavioural element in water saving as well as just the technological element.

Q193 Lord Broers: Have you made estimates as to how much you think you might be able to save?

Mr Wells: There is some real evidence. Some of my Defra colleagues may want to come in here because it is more their territory, but we have done a number of things in ODPM and our predecessors to test out these concepts. For example, there is the millennium community on the Greenwich peninsula, which is designed to test environmental sustainability, environmental friendliness in dwellings and I believe the evidence there is achieving about a 20 per cent saving in water use. There are some other examples with similar levels of saving. There are also estimates that in various ways you could seek to save particular amounts of water; not dissimilar amounts. You could have the aspiration to do that in new housing. Ministers are putting together an environmental package to go with their response to Barker and they will come out with some proposals before the end of the year.

Q194 Lord Broers: What about the idea of encouraging people to recycle water, use rain water etcetera? Do you encourage that?

Mr Hicks: That is probably more back into Defra’s territory because it does have implications for health and safety and so on.

Mr Bird: Clearly there are some interesting possibilities here around using grey water, as it is called, to help to address demand. We shall be keeping a close eye on that as the technology develops. There are some downsides, noticeably that it is quite a high cost system because you have to maintain the grey water systems on a fairly regular basis. There have also been concerns about possible contamination and health considerations. It is obviously of interest, but it is not an area one can go into without being extremely careful.
Q195 Lord Lewis of Newhamp: It strikes me, reading your papers, that the actual average household use of water is somewhere of the order of 150 to 200 litres per person per day, yet the amount of drinking water, which is really what demands the standards to which you actually supply water, is probably down, of the order of five or six litres. There seems to be a large discrepancy there between the amount which is being supplied at a high quality as opposed to the quality requirement of that actual five or six litres.

Mr Bird: If we were planning a new water system from scratch as this point it might have been possible to have distinguished between drinking water and other types of water through piped systems.

Q196 Lord Oxburgh: Is it not happening in these developments?

Mr Bird: For most national purposes, it is going to be difficult to put in entirely separate systems to achieve that. However, grey water may be an area where we can devise some local arrangements and we shall certainly be keeping an eye on this.

Q197 Lord Whitty: Mr Hicks has referred to the Water Framework Directive’s implications for planning, but to what extent are you already engaged with the industry on the implementation? Will there be adequate guidance as to what you expect the outcome of the Water Framework Directive to be? One of the problems is the non-congruence of the various cycles. There is the planning cycle, but there is also the price review cycle and you do not yet quite know what the definition of good quality water is going to be or your risk assessment and you probably will not know, just as we are moving into the next price review in 2009. Could you perhaps enlighten us a bit on your understanding of the cycle and how far have we got with the water companies?

Mr Bird: The Water Framework Directive is primarily directed at good ecological quality of water, so its primary focus is water quality. Clearly water supply has a very significant impact on water quality and certainly, in taking the planning for the Water Framework Directive forward through river basin management plans which the Environment Agency will be putting together, water supply must be a significant element in that. “The timetable is exacting” would be a polite way of describing it. We have a timetable defined in the Directive, which means that draft plans have to be submitted by 2008 and plans finalised with the associated programme of measures by the end of 2009. A great deal needs to be done between now and then. At the moment, Defra is focusing on producing guidance for river basin management planning and we are planning to get this out in the next few weeks. That will be a pretty comprehensive document. It is being produced in consultation with a wide range of stakeholders, including very much the water industry. They are very much part of this process and clearly we shall be very interested to have their comments on it. A lot of preparatory work is being done. As this goes forward the link between the Water Framework Directive and the price review will need to be worked through very closely. Already some initial discussions are going on between the key players, the Environment Agency, Ofwat and us. It looks as though there is a reasonable prospect that we shall get some congruity of timing, because the next round of price review will be in 2009. The draft plans will be available to inform that. It is clearly going to be an extremely testing process for all concerned. There is of course the process of subsequent interim determinations of prices, where it will be highly desirable for much of the Water Framework Directive first round to be picked up in the 2009 price review. It is possible for there to be subsequent consideration through the interim determination process.

The Committee suspended from 4.47pm to 4.57 pm for a division in the House

Q198 Lord Whitty: There is another non-congruity in the Water Framework Directive in that the Directive itself is largely enabling and strategic and facilitating and was therefore heralded in Europe as a bit of modern regulation. Actually there are both pre-existing and daughter directives which are much more prescriptive, in particular the current proposals for the Priority Substances Directive, which sounds to me extremely prescriptive and it has certainly been represented to us as extremely expensive to implement. How do you see that sort of dichotomy between the approach of the Water Framework Directive itself, which gives you some scope as to how you meet the objectives, and these rather prescriptive daughter directives? There is also a Habitats Directive which pre-existed, which is also quite expensive and prescriptive.

Mr Bird: There is a distinction between the pre-existing legislation, which to a large degree continues, although one or two directives will be subsumed in due course in the Water Framework Directive and the new generation of daughter directives. As far as existing directives are concerned, we have no discretion as an individual Member State, although of course we can bring to the Commission’s attention where we think existing directives contrast with the approach in the Water Framework Directive. We shall certainly be taking opportunities to do that where appropriate. On new directives, obviously we should like to see the Water Framework Directive approach applied where possible because it does allow for a more effective balance in our view
between the environmental benefits of improving water quality and the costs to users. Also, the Water Framework Directive is helpfully dynamic and we think it is better able to take account of factors like climate change, because there will be a six-year planning cycle and changes of that sort, in so far as they can be addressed, will be picked up in those planning cycles. On the Priority Substances Directive, we have not actually yet had a proposal from the Commission. We have certainly been making the Commission fully aware in pre-publication discussions of our concerns that the Directive should strike the right balance and we think that there has been some progress, for example in the fact that the Commission have now done a full regulatory impact assessment for that proposal. We shall continue to work hard at this and we are pushing for the maximum degree of flexibility on the same lines as the Water Framework Directive.

Q199 Chairman: This daughter directive is a key area. It would be helpful if you could just give us some idea as to what extent you are going to empower or allow interested bodies, not least the water companies, to help formulate a directive which might be practical and relatively user-friendly, or at least fit for purpose.

Mr Bird: The water industry have their own European association called EUREAU, which keeps an eye on developing European proposals. I know that they have been putting in quite a lot of effort to this particular area to bring concerns to the Commission’s attention. We work closely with not just the water industry but also the Environment Agency, who are often approached by the Commission and approach the Commission on forthcoming proposals. We do work as closely as we can with other organisations to get the messages we want through to the Commission.

Q200 Chairman: Many of us have seen, and I am sure Lord Whitty in his previous career will have seen more than most, examples of lack of transparency in EU draft directives which come on an unsuspecting public and certainly interested parties. The more transparency, the more opportunity there is to see these directives in draft and to make a contribution when they are still being formulated, the more desirable. Is this draft directive on a website? Mr Bird: We have not seen a text recently of the possible draft and I do not think it is on the website at the moment. If it is, we shall certainly alert the Houses of Parliament to that.

Q201 Chairman: That always seems to me the most sensible way to ensure that people are not caught by surprise. Even if it is an early draft, the fact that it is going to be changed does not particularly matter. I hope you will be striving to get this degree of transparency.

Mr Bird: We shall.

Q202 Lord Whitty: Affordability should be fully built into these directives because at the end of the day it is going to be the consumer who pays for this. I know there are references in the Water Framework Directive itself that it does need that dimension.

Mr Bird: Yes; indeed.

Q203 Lord Oxburgh: Following on from the European directives discussion, there is a question of the distribution of costs between consumers and those involved in agriculture. What sort of hand are you taking in that? I guess we are a little premature with this question, but on the other hand it is one which will arise and agriculture is a significant source of diffuse pollution.

Mr Bird: It is a very important and significant question and we are devoting quite a lot of effort to it, both nationally and internationally. Internationally we have been instrumental in getting a steering group set up through the mechanism of European Union water directors to look at diffuse pollution from agriculture issues. We have been very strongly encouraging that this is not just confined to water people, but that the agriculture sector is fully involved in this. We held a conference during our presidency in September which was designed to bring together agriculture and water constituencies on this. This has some immediate practical implications. The Common Agricultural Policy reform has already shifted resources into the environment axis and there are opportunities for using this to meet our obligations in the Water Framework Directive through helping farmers raise their game on good water management and practice. Obviously we will very much want to stake out a position for future reform of the Common Agricultural Policy here as well. It is encouraging that the Commission’s DG Agriculture are participating increasingly actively in this work. Nationally we have a catchment sensitive farming initiative moving forward. We have funding of a total of £25 million for the next two years; probably £10 million in 2006-07 and £15 million in 2007-08 which is available for helping farmers to get better information. It is particularly focused on information and improving advice and guidance to farmers. Further details will be announced fairly shortly about that. We are also considering a wider range of measures and there was consultation in June last year, a joint consultation with Defra and the Treasury, which opened up a range of regulatory and economic instrument options and those are now being pursued in the light of the reaction. We are
expecting to produce a further more specific consultation document later next year. **Chairman:** That brings us to the end of the questions we were proposing to ask you. Unless my colleagues have any further questions they wish to put to you, I shall, on behalf of them, thank all four of you from the two departments very much and apologise for the disruptions. It has not been easy for you, but that is the handicap of holding these sessions in the afternoon rather than the morning. Thank you again very much for joining us today. If there is anything further you would wish to submit to us, we should be delighted to receive that in writing. Thank you very much indeed for your help.
The Environment Agency has a duty to conserve, augment and secure the proper and efficient use of water in England and Wales. It works to reconcile the needs of society with the protection and enhancement of the environment.

— The population density of England and Wales means that, for each person, there is relatively little water. Across much of the country current abstraction to support our water use accounts for all the water resources available in summer months.

— Household demand for water is set to rise significantly over the next 25 years, particularly in the south east of England. Climate change is expected to reduce the availability of water resources.

— The only certainty in planning for the future management of water resources is that we cannot predict exactly what the future will bring. Solutions to securing water supplies must consider costs, benefits, risks and uncertainties, and balance costs and risks in particular.

— Traditional resource side options, such as reservoirs, are generally expensive, inflexible and high impact socially, economically and environmentally. In addition, “large infrastructure projects” may take up to 20 years to develop—committing customers and society in general to an ongoing high energy/cost solution. Some new reservoirs may prove to be necessary, but must be balanced by lower cost, flexible opportunities to secure more efficient use of existing water resources.

— Demand management options will mitigate or at least defer the need to develop some resources. Demand management is key to establishing an appropriate mix of schemes which are essential for us to meet the very substantial challenges we are facing in maintaining secure, sustainable water supplies into the future. This twin track approach is essential to balancing the social, environmental and economic needs of England and Wales.

— The delivery of a longer-term twin track strategy is reliant on a number of key actions and policy changes to increase the pace and effectiveness of demand management solutions. The key areas requiring policy intervention include the removal of constraints on more rapid household metering penetration, incentives and opportunities (retrofit within the existing housing stock) for water efficiency and raising public awareness and education with respect to the needs and benefits of reducing water consumption. Water labelling of fixtures, fittings and appliances would have a beneficial role.

1. INTRODUCTION

1.1 Water is essential for the environment and for human use: society and the economy. The Environment Agency has the statutory responsibility for managing the water resources of England and Wales. It is responsible for securing the proper and efficient use of water resources and for controlling the allocation of water through the grant of abstraction licences. Water companies have duties to develop efficient sources of supply and to further water conservation and water efficiency. Ofwat must ensure that water companies are funded to achieve their statutory duties.

1.2 In its recent report “Efficiency in water resources management” the National Audit Office commented that “the Agency’s regulation of abstraction protects resources worth some £72 billion to licence holders. Clearly, water use is of such importance that its value to the economy as a whole is incalculable”.

Memorandum by the Environment Agency

SUMMARY

The Environment Agency has a duty to conserve, augment and secure the proper and efficient use of water in England and Wales. It works to reconcile the needs of society with the protection and enhancement of the environment.

— The population density of England and Wales means that, for each person, there is relatively little water. Across much of the country current abstraction to support our water use accounts for all the water resources available in summer months.

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— The delivery of a longer-term twin track strategy is reliant on a number of key actions and policy changes to increase the pace and effectiveness of demand management solutions. The key areas requiring policy intervention include the removal of constraints on more rapid household metering penetration, incentives and opportunities (retrofit within the existing housing stock) for water efficiency and raising public awareness and education with respect to the needs and benefits of reducing water consumption. Water labelling of fixtures, fittings and appliances would have a beneficial role.
1.3 Our vision for water resources in the next 25 years is:

*Abstraction of water that is environmentally and economically sustainable, providing the right amount of water for people, agriculture, commerce and industry, and an improved water-related environment.*

1.4 We base our management of water resources on the principles of sustainable development, taking into account social, economic and environmental needs. Planning our future water requirements and setting an approach for a strategy is based on a “twin track” approach. This optimises the management of water demands against the alternative of increased resource side production. This takes a balanced view, seeking the efficient use of water while bringing forward timely proposals for resources development where appropriate. We also need to acknowledge the uncertainties that are associated with many of the factors that affect water resources management. This means that we must identify a way forward that is flexible and robust to a range of possible future scenarios. It is important to understand the risks associated with any particular course of action; failure of public water supply would be unacceptable in terms of its social and economic impacts and we must plan prudently.

This submission draws out the risks and uncertainties, which will test our management of water resources over the next 25 years.

2. **The Problem**

2.1 **Current state of water resources**

2.1.1 Water is a renewable but finite resource. Rainfall varies across England and Wales from over 4,000 mm/year in Snowdonia to less than 550 mm/year in parts of East Anglia, with an average of 897 mm/year. Year-to-year variability in rainfall can be significant; the winter of 2004–05 yielded only 70 per cent of the long-term average rainfall and this is not the lowest we’ve ever seen. In some parts of the south east, groundwater levels are currently (early October 2005) below recorded minima and river flows are well below average for this time of year.

2.1.2 Although England and Wales are commonly perceived as wet, the high population density means that for each person there is relatively little water (1,334 cubic metres per year (m$^3$/a) on average). Less, in fact, than in most Mediterranean countries (Spain 2,775 m$^3$/a; Portugal 3,878 m$^3$/a). In the Thames basin there is only 266 m$^3$/a for each person.

2.1.3 The total demand by agriculture, industry, commerce and households totals some 299 m$^3$/a for each person in England and Wales. The legislative and regulatory framework within which water resources are managed is designed to ensure that we meet the needs of society, the economy and the environment. This framework, together with the infrastructure and investment provided by water companies, aims to ensure that we can maintain both secure water supplies for the country and a reasonably healthy water environment. The framework is intended to minimise risks to suppliers and the environment overall.

2.1.4 The overall situation does not give room for complacency. Across much of England and Wales (Map 1 in the Appendix) current abstraction accounts for all the water resources available in summer months. This means that the Environment Agency cannot permit any further summer abstraction because it would reduce the water available to existing abstractors and to the environment. Many licences already contain conditions to protect other interests during periods of low flow. Many groundwater bodies are also fully committed for abstraction.

2.1.5 In some locations, abstractions authorised under licences granted historically are causing environmental degradation. There are some 600 sites (Map 2 in the Appendix) where we believe that current licensed abstraction may be causing environmental degradation, or has the potential to do so. Dealing with these damaging abstractions will be expensive. We believe that up to £450 million in compensation could be payable to licence holders if their licences have to be revoked or modified.

2.1.6 Water mains and sewerage infrastructure have a finite life period and can only be maintained for so long. We are concerned that companies’ water mains are not being replaced fast enough. For example over 60 per cent of Thames Water’s water mains are over 100 years old. Ofwat’s final determination of the 2004 price limits for water companies’ has allowed for Thames Water to undertake a large-scale programme of targeted mains replacement of more than 1,200 km over the next five years, costing about £500 million. This is equivalent to an annual replacement rate of 0.8 per cent; at these rates it would take 128 years to replace the network. Several other companies have annual replacement rates well below 1 per cent. This means replacement over a 100 period or longer.
2.1 We are equally concerned about companies’ sewerage infrastructure, which is mostly old, and does not meet current standards of containment for adoption of new sewers. It allows leakage of groundwater into the system, and in some cases sewage leaks out, contaminating groundwater.

2.2 Pressures on water resources and the environment

2.2.1 Household demand for water in England and Wales is predicted to rise by over 1000 Ml/d (12 per cent) over the next 25 years (see Figure 3 in the Appendix that shows the changes for the south-east). This is partly the result of an increasing population and housing growth in the south-east. The trend of fewer people occupying a household also contributes to this increase, as individual water use tends to be higher in lower occupancy houses. In addition this predicted rise is also partly a function of lifestyle changes in the home. For example greater proportion of homes with power showers, jet wash systems, combi boilers, garden irrigation systems etc. We have already seen an increase in individual consumption of 10 litres per head per day (7 per cent) over the past decade.

2.2.2 This increase will be partly offset by the predicted fall in non-household demand of 300 Ml/d for England and Wales over the next 25 years. Industrial demand is declining but there is still much more scope for water efficiency, providing significant cost savings for industry and commerce. Demand for treated water for irrigation purposes are expected to rise in the future. There are significant uncertainties as to what future agricultural demand will be since it will be influenced by agricultural policy, climate change, supermarket policies, customer demands and international competition.

2.2.3 Water companies will need to take action now to manage this increased demand. About half of water companies’ resource zones would be in supply deficit by 2015 if no action was taken (as shown in Map 4 in the Appendix). The largest deficits are in the south-east where predicted development growth is greatest.

2.2.4 Every five years water companies prepare new 25-year plans. These form part of their submission for the Periodic Review process. We scrutinise these plans to make sure that all companies have good plans to maintain water supply, and that they take action at the right time. We reported to Ministers (Maintaining Water Supply, July 2004) that all companies, if they follow their water resources plans and their drought management plans will be able to meet their customers’ needs for water for the next five or more years. Some companies need to take steps quickly and we are tracking progress on these. We review water companies’ actions on their plans annually and report to Ministers.

2.2.5 We also seek drought plans from water companies every three years. These are operational plans that show how water companies will manage drought with their present resources. They include details of demand restrictions such as hosepipe bans, and proposed sites where additional abstraction will be sought in dry periods. Good planning is the key to good drought management.

2.2.6 Increased temperatures through climate change will increase household water use further, in particular for garden watering and outside activities. Demand for agricultural irrigation will also increase under drier conditions. Climate change is anticipated to reduce the availability of water resources through longer drier summers and shorter wetter winters. The timing and magnitude of impacts is uncertain. The current predicted impact on water resources is relatively small in the 2020s but becomes more significant in the second half of the century. It is important to recognise, however, that some uncertainties do exist with these predictions and these could change as further climatic indicators develop. There is also evidence that year-to-year variability of rainfall will increase, meaning the climate will be less predictable with more dry years and more wet years. As a result we will see more periods of more intense flood and drought by the 2080s.

2.2.7 There is pressure for environmental improvements from both national and European legislation and also from society’s expectations of the quality of our environment. We know from customer research during the Periodic Review 2004 that people want to protect the environment. This creates tension between people’s water requirements and environmental needs.

2.2.8 Future changes in land use will exert further pressures on our water resources. For example, urban development increases the area of impermeable surfaces which reduces groundwater recharge, increases localised pollution where run-off picks up contaminants, and increases the likelihood of localised flooding. Farming practices can also affect river flows as field drainage can increase the speed with which rainfall reaches rivers and bare soils can encourage soil erosion, leading to siltation problems in rivers.

2.2.9 The capacity of our sewerage systems and sewage treatment works is not sufficient to cope with increased development growth and climate change. Our research has shown that up to 40 sewage treatment works in the South East growth areas do not have the capacity to deal with anticipated pressures from
further urban development. A more strategic and long-term approach to surface water drainage and sewerage planning is needed. This will help ensure that infrastructure can cope with increased growth, climate change and allow better planning for the Water Framework Directive (WFD).

2.2.10 Diffuse pollution from pesticides and nitrates used in agriculture has meant that we have seen declining groundwater quality since 1975. As a result groundwater public water supplies now often require further treatment. Our drinking water quality is also at risk from other sources of diffuse pollution such as leaking sewers, run-off from contaminated land, misconnections and accidental leaks and spills. Further improvements to sewerage systems infrastructure including sustainable urban drainage solutions alongside further treatment at sewage treatment works are needed to reduce this impact.

2.2.11 In 2001 the Environment Agency published national and regional water resources strategies (*Water Resources for the Future, March 2001*). The strategies look 25 years ahead and consider the availability of water and future pressures and options for meeting future demand taking account of uncertainties and risks. The strategies provide a long-term framework for our other water resources management activities. We expect to review these strategies in 2008.

3. Towards a Solution

3.1 It is clear that the pressures on water resources in England and Wales will increase in future decades. Growing demand for water, the need to protect the environment and the effect of climate change all add to the challenges. Managing water resources for future generations requires difficult decisions now if we are to maintain a secure and sustainable water resource position.

3.2 There is no simple solution. Every option has its advantages and disadvantages, and its costs and benefits. A solution that deals perfectly with one possible set of future conditions may fail spectacularly if the future turns out to be different.

3.3 We believe that water resources planning must consider a range of scenarios rather than simply considering one possible forecast. These scenarios should encompass a range of plausible future conditions. For water resources, the challenge is to find a solution that can cope with this range without either running out of water or wasting money and resources on development that turns out to be unnecessary.

3.4 Our 2001 water resources strategy used this scenario-based approach. The discipline of considering a range of possible futures ensures that planner considers a fuller range of costs, benefits, risks and uncertainties. A set of solutions to a supply deficit is more likely to be successful if it balances cost and risks across the set of solutions. This means that it can include some cheap but risky options as well as more expensive, more certain options.

3.5 We believe that the principles of sustainable development should be at the centre of the decision-making process. This means considering the economic cost, the direct and indirect environmental impact, and the social dimension of all of the options. None of these dimensions should be considered to be more important. We find that decision-makers often consider cost separately, looking for least-cost solutions when it would be more effective for society to seek approaches that balance all of the dimensions of sustainable development. This “low regrets” approach is seen by many to be the most effective way of dealing with the uncertainty of climate change.

3.6 The pressures on water resources mean that change to the way we manage water supply is inevitable. Our assessment for our 2001 water resources strategy supports the Government’s “twin track” approach to water supply. Put simply, this involves considering options that will develop more water supplies alongside options that will help to manage demand.

3.7 Demand management

3.7.1 Demand management encompasses a wide range of activities. The main ones are summarised below.

Leakage

3.7.2 Nearly a quarter of water (some 3608Ml/d: enough to supply 10 million households) still leaks from water companies’ supply networks. Most water companies forecast that this will remain constant over the next 25 years. Water companies are cautious about their ability to reduce leakage levels further in the long-term. We think there is a need for further research into technological developments that will lead to improved leakage performance and a need to review how companies can more effectively manage their supplies to customers. Repairing leaks is an important part of leakage control, but systematic replacement
of the ageing mains network is also essential. In major cities across England and Wales, parts of the mains network are over a century old. These old water mains can only deteriorate further over time, making leakage harder to manage and adding to the pressures on water resources. Current mains replacement and refurbishment rates vary between 0.03 per cent and 3.8 per cent across the water companies of England and Wales. Few of these replacements have been as a consequence of high leakage: other quality criteria are the main drivers for this activity. There is little publicly available information that quantifies the investment in leakage driven mains replacement.

Industrial and commercial water use

3.7.3 Around a third of the water supplied goes to industrial and commercial customers. Many cases studies have shown that most of these water users can make savings of between a quarter and three-quarters of their water use with simple measures that will pay for themselves within two or three years or more rapidly. However, few organisations implement these measures. This is partly through ignorance, but also because this sort of activity is rarely a priority for a company that can make more profit by spending its time on other commercial activities. Water is a relatively cheap commodity for many industrial and commercial users and consequently is often one of their smaller utility bills. More work should be done to promote the benefits to these organisations. Initialising water savings requires outside intervention. Water companies should play a greater part in helping to realise industrial and commercial demand savings, but there is also a place here for more independent advice from an organisation that specifically has this remit.

Household water use

3.7.4 About two thirds of water supply goes to households, and household demand is increasing. The rise in demand is the result of a combination of factors: (Already in section 2.2.1)

— Increasing per capita consumption due to changing lifestyles.
— Increasing population and number of households in some areas, particularly southern England.
— Trend towards fewer people in households tends to increase the per capita consumption.

There are many opportunities to save water in the home.

More efficient appliances

3.7.5 Today’s washing machines can use as little as 45 litres for a cycle yet there are still machines on the market using over 100 litres. There is no longer a correlation between water use and price, with some of the cheaper machines performing very well. The same is true of dishwashers, which used sensibly can save water compared to washing up by hand. An improved labelling scheme would help people to choose appliances that meet their needs but use less water. This must be accompanied by clear information that explains the need to save water. We think that all new properties should be fitted with low water use appliances as standard—this may require regulation to ensure a level playing field for developers.

Improved bathroom fittings

3.7.6 Toilet flushing accounts for about a third of household water use. Old toilets use a fixed nine litres per flush but there are designs now that use a range of dual flush volumes, some as low as four litres and two litres. Fitting better toilets to new houses will give valuable water savings, but the biggest savings will come from reducing flush volumes in the existing housing stock. Water Supply (Water Fittings) Regulations (1999) control new bathrooms fitted in old houses, but there is little information on water use for householders choosing new bathrooms. The regulations do not set particularly challenging standards and arguably follow the market rather than drive it.

3.7.7 Defra should complete its development of a labelling scheme for water fittings and appliances as a priority. Point of sale information will not only assist purchasers choose the most efficient option but also provide planners with an opportunity to specify their requirements for water efficient design without referring to specific products. One of the current leaders in the use of planning regulations to deliver water efficiency is Kent County Council. It has now incorporated best practice technology recommendations in its “Design Code”. Developers and their contractors should also welcome such a scheme, as it is likely to make the process simpler and more transparent.

3.7.8 Bathrooms are changed every 20 to 30 years on average, so waiting for replacement will deliver water savings only slowly. It is possible to adapt existing toilets to use less water, both by reducing the flush volume and changing the mechanism to allow a dual flush. This might cost the equivalent of 2.2 pence/
m$^3$. We think that widespread, well-publicised campaigns to modify existing toilets would be of enormous value in areas where water is particularly scarce. At Ofwat’s final determination in 2004 Southern Water Services secured a capital scheme to retrofit toilets in one of its resource stretched areas, as a least cost solution to maintain supplies.

**Personal washing**

3.7.9 Personal washing is about a third of household water use—about 50 litres per person per day. Showering rather than bathing can reduce water use, but a five-minute shower under a modern power shower can actually use more water than a bath. Shower head design and the use of restrictors is important—with good design, reduced water flow can be achieved without changing the user’s experience. Again, there is little information available to householders on how to choose showers.

**The role for building standards**

3.7.10 Government has committed to improve the energy and water efficiency of new buildings through regular reviews of Building Regulations. It is essential that Regulations stipulate minimum standards and make provision for their effective enforcement. The Agency expects the inclusion of water conservation within the revised Part G Approved Document to challenge current installation practice and drive improvements in water efficient fittings. There is also potential to extend the scope of Building Regulations as a result of the Sustainable and Secure Buildings Act. However, it is as yet unclear how Government will introduce these powers, or how the Building Regulations will develop in the future.

3.7.11 The Code for Sustainable Building will be introduced in 2006 and will apply to all public and private housing schemes. Government indicated in its election manifesto that Local Authorities would also be encouraged to adopt the standard. The Code is expected to set voluntary standards that subsequently could be adopted as regulations in future revisions to Building Regulations.

3.7.12 A pilot programme is needed to establish the effect that water efficiency measures might have on consumption. This would indicate whether consumers accept such intervention and respond as required. Defra plans to examine affordability issues using a pilot study. A similar initiative is needed to test water efficiency aspects. It would be sensible to combine this with the affordability research, acknowledging that our aim is to make all households water efficient, not just those who have difficulty in paying their bills. The opportunity presented by these trials should be seized.

3.7.13 In 2003, Government stated that water consumption in new houses could be between 25 per cent and 30 per cent lower than conventionally built houses and that regulation would be introduced to move consumption in this direction. Current average water consumption in new buildings is estimated to be 150 litres per person per day. Water efficient fittings and appliances can lower this to approximately 105 litres per person per day. This level of water efficiency will be achieved only if regulation provides the necessary minimum standard, as there is no indication that purely voluntary action is likely.

3.7.14 These technical improvements will be of most value if people realise that there are good reasons for saving water and therefore make best use of water around the home. There are two parallel activities that together will make household use of water more efficient: household water metering, and education and information.

**Household water metering**

3.7.15 About a quarter of households in England and Wales have meters and pay for the volume of water that they use. The other three-quarters have no financial incentive to save water, and no way of knowing how much water they use. Yet evidence shows that people who switch to a meter save between 9 per cent and 14 per cent of their water use and that this saving seems to be maintained.

3.7.16 We want to see rapid progress in household water metering, especially in those areas of the south-east where water is scarce. Existing mechanisms for increasing metering are piecemeal, relying on people choosing to have a meter or on water companies metering houses on change of occupancy. This is a slow and expensive way to increase metering. We call for changes to regulations to make it easier for water companies to meter all customers in areas where water is scarce. Compulsory metering must include social safeguards to make sure that vulnerable groups do not suffer as a result of metering. Furthermore, once metering penetration achieves appropriate thresholds the opportunity exists to trial and introduce variable tariff options in the future.
3.7.17 Metering is only part of the solution. Water companies must take responsibility for helping people to understand their water bill. For example, the bill could include information on whether water use has changed since the previous quarter or since the same quarter of the previous year, as well as information on normal levels of water use.

Education and information

3.7.18 People have no incentive to save water or to find out how to become more water efficient. This is because only a quarter of households pay for the volume of water they use, water is still relatively cheap compared to other utilities and people fail to make the connection between their water use and the environment.

3.7.19 There is no single, reliable source of information where people can go to find out how to save water. The information available from different water companies varies in quality and usually takes the form of leaflets with bills and information on the company’s website. For householders, there is no source of practical help with saving water.

3.7.20 We believe that education, information and practical help will be vital in managing water resources for future generations. It is obvious that people will not save water without knowing how and why they should. It is perhaps less obvious that this requires long-term, concerted effort over many years. We have two practical examples that show the need for long-term effort in changing people’s behaviour. In raising flood awareness, we have found that without annual campaigns at the end of the summer, people do not prepare adequately for possible flooding. Household waste minimisation is another area where it has taken many years to raise public awareness to the point where people really understand the need to reduce waste and to recycle.

3.7.21 We cannot expect isolated short-term campaigns from a variety of sources to deliver prolonged and sustained water savings. We believe that only an independent Water Saving Trust can save water effectively over long periods. The Trust must be set up specifically for this purpose—combining saving water with the wider objectives of an existing organisation would inevitably dilute the message and divert attention from the need to save water. The Water Saving Trust would not only provide information—it would also provide practical help in saving water. For example, it would award grants for improving bathrooms to improve both quality of life and to save water. Similarly, grants could help people buy low water-use washing machines. These grants would be targeted to the social groups that would benefit most, and in the areas where saving water would be most valuable. Such sustained campaigning would be the most efficient way of spending money on saving water.

3.7.22 In order to deliver worthwhile improvements, the Water Saving Trust requires funds in the order of £10 to 15 million each year for at least the next five years. This is excellent value—equivalent to only 50 pence per household per year. Funding should be from general taxation: the benefit of saving water will accrue to all of society, and this is the only rational way to fund such savings. Adding this cost to water company bills would not be appropriate, as it would be a regressive form of taxation that penalised people who already struggle with paying high water bills.

3.8 Resource development

3.8.1 In much of south-east England, there is very little scope for developing local, simple solutions to water supply deficits. This means that resource development options are complex, relatively expensive, and will take many years to construct. The two main options that could help to meet deficits in the south-east are new or extended reservoirs and desalination.

3.8.2 New reservoirs are usually controversial. Suitable sites are hard to find and it is usually necessary to use compulsory purchase to acquire land. Local opposition can be substantial and we expect that in many locations planning inquiries would be prolonged and difficult. Reservoirs need to be filled with water. In lowland England this means pumping water from a nearby river. There are few rivers with substantial volumes of water that is reliably available even in winter, so the opportunities for significant new reservoirs are rare. There are also wider environmental considerations: construction will create increased heavy traffic over several years. Construction of major schemes can sometimes take years longer than expected. It is generally accepted that it will take 15 to 20 years from initial design to deployment of a reservoir. Water is heavy and pumping it into reservoirs uses much energy, creating additional greenhouse gases and contributing still further to climate change. On the other hand, new reservoirs provide a reliable source of water and are options that deserve serious consideration.
3.8.3 Extending existing reservoirs can be a good option. Extension is normally by raising the dam wall by several metres. This is a major civil engineering undertaking that is not always possible. In any case, it is only feasible where the additional volume of reservoir generated is significant.

3.8.4 Desalination provides a very reliable source of water, but the wider environmental implications are very significant. Desalination is becoming more efficient but still uses substantial amounts of energy. Total energy use depends on the scale of production, the type of process, the scale of production and the salinity of the water, but typically can be in the range of 6–10 kWh/m³. This makes the water expensive—typically in the range of 60 to 100 pence per cubic metre of water. Depending on the energy source, there can also be a significant contribution to greenhouse gases. Desalination also creates a waste stream of highly concentrated salts, with salinity up to double that of seawater. This can cause local problems with discharges and it may not be possible to dispose of saline water in coastal waters. Landfill may be the only alternative in some places. Desalination can be deployed quickly and can be very effective in dealing with extreme peak demand.

3.8.5 Future supply deficits are generally the consequence of rising demand. A “predict and provide” strategy to fulfil unconstrained demand would necessitate developing new resources that are expensive and environmentally damaging as well as risky. For example, we estimate that it would cost between £1 billion and £2 billion to half the frequency of hosepipe bans.

3.8.6 In their latest plans, water companies propose in the next 25 years to construct five new reservoirs, three extensions to existing reservoirs, two desalination plants and other re-use schemes. These will have a total capital cost of around £1.5 billion and would deliver around 900 Ml/d (about 6 per cent of current public water supply). The details of these resources developments are detailed in Table 5 in the Appendix.

3.8.7 At some point we must manage demand so that it does not continue to rise, because there will come a point when new resource development is not affordable for society as a whole.

3.8.8 Demand management will take time to deliver results. Experience from other fields shows that changing people’s behaviour requires a multivariate approach, with a mixture of information from a variety of sources as well as incentives for change. It takes many years before a change in behaviour delivers substantial benefits. We need a step-change in demand management activity now to make sure that we can deal with future changes in the supply-demand balance. And over time, change attitudes and behaviours with respect to water.

3.8.9 Opportunities already exist, however, to reduce water use in the home through best practice fixtures and fittings in the home and work place. This approach does not require a change in behaviour and need not impact lifestyle. Consequently, this approach represents an important opportunity, which should yield a much more rapid solution and benefit.

4. The Solution

4.1 It will be clear that the Environment Agency favours a balanced approach to solving the problems of meeting future water supply. Water companies must consider supply options such as new resource developments, but equally must invest in options that help to control demand. Decisions should be based on the principles of sustainable development, considering social and environmental consequences, as well as short-term financial cost. This must also consider all of the risks and uncertainties.

4.2 Water companies’ latest plans propose eight new or extended reservoirs between now and 2025. These will cost well over £1 billion. We believe that some of these may prove to be necessary and we urge companies to develop the case for these so that they can undergo full public scrutiny. At the same time, we believe that water companies must put much more effort into helping people to save water. Currently, companies spend some £26 million pa for the 24 million households they supply, on water efficiency measures which includes supply pipe leakage assistance. We believe that the latter activity accounts for the majority of this expenditure. Re-balancing investment from resource development towards demand management would help to achieve a more sustainable and secure future.

October 2005
APPENDIX

MAP 1

CURRENT INDICATIVE AVAILABILITY: SUMMER SURFACE WATER

MAP 2

SITES WHERE CURRENT LICENSED ABSTRACTION IS BELIEVED TO BE UNSUSTAINABLE
FIGURE 3
WATER COMPANY REPORTED (2005) AND FORECAST (TO 2030) OF TOTAL DEMAND IN SOUTH EAST ENGLAND

MAP 4
PERIODIC REVIEW 2004 SUPPLY DEMAND BALANCE—WATER COMPANY ZONES WITH A DEFICIT BETWEEN NOW AND 2015
29 November 2005

TABLE 5

RESOURCE DEVELOPMENTS PROPOSED IN WATER COMPANIES' 2004 WATER RESOURCES PLANS

Reservoirs and schemes
New reservoirs

<table>
<thead>
<tr>
<th>Company</th>
<th>Scheme</th>
<th>Year</th>
<th>Ml/d</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Mid Kent</td>
<td>Broad Oak</td>
<td>2019</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Folkestone and Dover</td>
<td>Clay Hill</td>
<td>2015</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>South East Water</td>
<td>Havant Thicket</td>
<td>2020</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Portsmouth</td>
<td>Abingdon</td>
<td>2020</td>
<td>380</td>
<td></td>
</tr>
<tr>
<td>Severn Trent</td>
<td>Lower Severn</td>
<td>2022</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>563 Ml/d</td>
<td>£1,038m</td>
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Extended reservoirs

<table>
<thead>
<tr>
<th>Company</th>
<th>Scheme</th>
<th>Year</th>
<th>Ml/d</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern, Mid Kent</td>
<td>Raising Bewl</td>
<td>2015</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>South East Water</td>
<td>Bray Enlargement</td>
<td>2008</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Essex and Suffolk Water</td>
<td>Abborton</td>
<td>2014</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>80 Ml/d</td>
<td>£126m</td>
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Desalination

<table>
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<th>Company</th>
<th>Scheme</th>
<th>Year</th>
<th>Ml/d</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>South East Water</td>
<td>Newhaven</td>
<td>2006</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Thames</td>
<td>London Gateway</td>
<td>2008</td>
<td>140</td>
<td></td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>150 Ml/d</td>
<td>£212m</td>
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Other big schemes

<table>
<thead>
<tr>
<th>Company</th>
<th>Scheme</th>
<th>Year</th>
<th>Ml/d</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern</td>
<td>Hardham Effluent</td>
<td>2016</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Three Valleys</td>
<td>ASR Essex</td>
<td>2019</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>30 Ml/d</td>
<td>£29m</td>
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Examination of Witnesses

Witnesses Baroness Young of Old Scone, a Member of the House, Chief Executive, Environment Agency, Dr David King, Director of Water Management, and Mr Ian Barker, Head of Water Resources, Environment Agency, examined.

Q204 Chairman: Welcome to Baroness Young and her colleagues. Could I start by asking if you would like to introduce your team?

Baroness Young of Old Scone: My name is Barbara Young, and I am the Chief Executive of the Environment Agency. David King is our Director of Water Management and Ian Barker is our Head of Water Resources.

Q205 Chairman: Would you like to say anything by way of introduction or shall we go straight into the questions?

Baroness Young of Old Scone: Simply to say that this is a very timely inquiry because we are in the middle of the deepest drought for the last 30 years and issues of water resource are extremely important. Not enough is being done to improve the efficiency with which we use resources in this country so we would be delighted if the Committee were to put a spotlight on that issue.

Q206 Chairman: Thank you very much. I should just say that there is an information sheet available at the door for anyone from the public who wishes to note interests and the basis on which we are setting up this inquiry. If I could start by asking you to elaborate on the responsibilities and priorities of the Environment Agency in water management terms and particularly perhaps just remind us how you complement the role of the other two regulators, Ofwat and the Drinking Water Inspectorate?
Baroness Young of Old Scone: Our primary responsibility is for the environment, that is what it says on the tin as it were, but in water resources terms we also have an additional responsibility for managing water resources so that there is enough water for a whole range of uses, for public water supply, for agriculture, for industry, and we do that in a way which does not damage the water environment. We have a range of mechanisms at our disposal, primarily abstraction licences, but we also have a role in looking at how the water companies are planning for water provision and we also want to promote the efficiency of water use by all users. So we have a complementary role to Ofwat, the economic regulator, who looks at the financing of companies in order to be able to achieve the environmental objectives that have been promoted by us and endorsed by the Minister, and we also work very closely with the Drinking Water Inspectorate which is responsible for the quality of drinking water. Many of the measures that we take in improving the quality of the water environment are important for the Drinking Water Inspectorate as well, for example nitrates in water are an issue in environmental terms but in human health terms as well.

Q207 Chairman: When we had the benefit of meeting Mr Fletcher from Ofwat he did say on the relationship generally, and I read here: “Baroness Young and I enjoy a little sparring match sometimes because we are coming at the issues from different directions, but it should not be exaggerated.” It would be interesting just to pick up on the very helpful written evidence you gave us where you do express some concern that the companies’ water mains are not being replaced fast enough. I refer to paragraph 2.1.6 of your evidence. You say that Ofwat’s final determination of the 2004 price limits for water companies would mean that the annual replacement rate for Thames Water would take over 120 years for the mains to be replaced. I think you imply that you are not exactly enamoured with that and you are concerned that other companies also have replacement rates of well below 1 per cent. Does this suggest that you feel that Ofwat got the settlement wrong?

Baroness Young of Old Scone: I think if you look over the last 15 years or so, in fact longer, there really has been quite a long-standing lack of investment in the water infrastructure. We are living on both water distribution and sewerage systems that in many cases are over 100 years old. There is quite a delicate balance in promoting an increased rate of replacement and asset maintenance because of all the other pressures that have also been on water charge payers, who at the end of the day pay for all these improvements. We have had major programmes in the last three price rounds of improvements to the water environment paid for by the charge payer and there has to be a decision at the end of the day about what is affordable or not. I think that is where the tension between Ofwat and ourselves tends to come. I think in retrospect, in the earlier stages of the successive price rounds we probably ought to have been pressing for a higher level of mains replacement and asset maintenance programmes, but there would have been this tension about affordability. The one thing that I deeply regret is not with the current water regulator but his predecessor Ian Byatt, who gave a substantial reduction in water bills to bill payers as his last legacy before he retired which, quite frankly, encouraged water payers to think that they were going to be able to see cheaper water at a time when these infrastructure investments were desperately required. I think that is where, if anything has gone wrong with the water price rounds in the last few years, it has gone wrong. There will always be this tension where we want more and those who are worried about affordability will want to see that capped.

Dr King: I think, Lord Chairman, it might be worth adding that if you were to look at the Thames situation where at the moment Thames Water are leaking in the order of 900 megalitres a day or almost a third of their water supply, that is against the background of the Capital having a deficit of some 200 megalitres or million litres a day in a dry year, then you have to ask the question is a replacement rate of less than one per cent adequate?

Q208 Chairman: From your evidence you clearly recognise that there are imperatives other than environmental but if environmental was the only consideration you would clearly wish the expenditure to be greater. That is the message I get.

Baroness Young of Old Scone: It is not just environmental, it is security of supply in the case of Thames where we are in a position where we could see public water supply restrictions if we have a very dry winter and spring as we did last year. We have not got a hope of getting a desalination plant or a new reservoir in time. The only way really to make progress is to speed up the rate of leakage reduction through asset replacement.

Q209 Chairman: So that would mean revising the Ofwat allocation or would you wait until 2009?

Baroness Young of Old Scone: I am sure Thames when they gave evidence to you would have talked about some of the restrictions. I am beginning to sound intensely reasonable here and I do not mean to be, quite frankly, because we are here to demonstrate the environmental case. However, there is no doubt about it that there are some constraints on the pace at which Thames can go in terms of the availability of skilled engineers and project managers, and the pace
at which they can get access to digging up the roads in order to repair the system. Nevertheless, we believe that they could go faster and there is a need for additional investment. That can be achieved through an interim determination by the regulator. Indeed we are seeing Thames next week to talk about not only the short term issue with drought but also their future security of supply.

Q210 Lord Oxburgh: If we may stand back a little bit and look at the relationship between your organisation and the water companies but also see that against a broader background of a need to take a long-term view of water provision in the country against the background of the possibilities of climate change, new town developments, shifts of population, I guess my question is where is that view formed? Is it your view, is it your view in consultation with others, and if such a view is formed how is it implemented?
Baroness Young of Old Scone: Ian, do you want to take that?
Mr Barker: We take our cue from the Government clearly in terms of the legislation but also the policy direction of what water companies should be doing in managing their resources and ensuring security of supply. In taking that view, we work closely not just with government departments but also other regulators and with the water industry. At a working level I think we have a good working relationship in working through then what the issues are and the responses which are appropriate to reconcile often difficult reconciliations between people’s needs and those of the environment. When it comes to issues like climate change, security of supply, and so on, then the Government relies upon us to advise it whether the companies are planning adequately, and in doing so we report to ministers, as we did last year as a result of the periodic review of water company prices about the adequacy of their long-term plans which, by and large, we said were not adequately complying with the ministerial direction in terms of the way in which they are proposing their investment to ensure secure supplies. By that I mean ministers were expecting companies to allocate their future management of resources between managing current demand and managing future demand and investing in resources as a balanced twin-track approach. Our submissions on this have made very clear that companies’ plans are predicated almost entirely on resource development of eight new or enlarged reservoirs and very little at all in terms of demand management, water efficiency and metering.
Baroness Young of Old Scone: I was just going to say the framework is that water companies do have 25-year forward looks at their water resources. We also do a 25-year forward look trying to set the framework periodically for that and we will be doing another one when we get the next climate change scenarios that form part of the climate change process and then, of course, we look on a periodic basis as part of the water price round at the 25-year plans and five yearly updates that the water companies produce, so they plan within a framework that ministers have already set some guidance for and then we do a “lit crit” exercise on water companies’ plans once they have drawn them up.

Q211 Lord Oxburgh: So there are not discontinuities in this because, in effect, you set the umbrella within which they operate?
Baroness Young of Old Scone: I think if push comes to shove there is a big question on who actually calls the shots at the end of the day.

Q212 Lord Oxburgh: Exactly.
Baroness Young of Old Scone: Ministers can give guidance to the water companies but at the end of the day if the economic regulator will not fund it or if the companies will not do it, it has always been a moot point as to what the final port of call is. One assumes that if it were something of huge significance that ministers would be able to find powers to instruct but they cannot instruct the economic regulator, it would have to be instructing the companies and then there is the problem of who pays. So it is quite a complex system. At the moment I do not think the wheels fall off totally but we do need a lot of pressure to get much more focus on the efficient use of water.

Q213 Lord Oxburgh: If I read you rightly, you are saying that at the moment you devise the plans and broadly the water companies fit in with those but the economic regulator—
Baroness Young of Old Scone: No.

Q214 Lord Oxburgh: No?
Baroness Young of Old Scone: In our 25-year strategy we looked at four socio-economic change scenarios and we said under these scenarios that these are the sorts of issues we think will arise in each of the parts of England, in each of the regions in the water company areas, and then the water companies set their 25-year strategies which they update every five years, and every five years we take a view of their strategy and say is this okay or is this not okay and report to the Minister. So the water companies are in the driving seat as far as describing in detail what their plans are going to be

Q215 Lord Oxburgh: It is the economic regulator who says whether that is going to be done or not or who can have a say on that?
Baroness Young of Old Scone: The economic regulator always says that he is there to ensure that the companies are adequately funded and that there is
nothing to stop them doing what they feel they must
do, in spite of the fact he has not funded it, but of
course water companies are not terribly enamoured
of that idea.

Q216 Baroness Sharp of Guildford: While we are on
this subject of co-operation and working together
could I pose this question of how far the ODPM
consulted you on the water supply implications of the
proposed new housing developments in the South
East of England. Were you sufficiently involved
with these? In a sense, how far were these plans prepared
in conjunction with the water companies simultaneously?

Baroness Young of Old Scone: I think the process is
greatly improved of late. I think in the early stages
there was not a huge amount of dovetailing of either
the planning process on a local basis or a national
basis. However, I have just left a meeting with
ODPM ministers and I think the process is much
improved, both in terms of relationships between
Defra, ourselves and ODPM and in terms of the
involvement of ourselves and the water companies in
things like regional spatial strategies, strategic
environmental appraisal of regional strategies and
also in the delivery on the ground through the
Sustainable Communities initiative where there is
now a lot of encouragement to the delivery bodies to
talk early to the water companies and ask about their
proposals for development. We do need to face the
fact that with the sorts of increases in housing that are
being proposed under the Sustainable Communities
plan and which may emerge on Monday with the
Barker announcement, as part of the pre-Budget
statement, that these have not in many cases yet been
taken into water companies’ long-term plans because
they have emerged faster and later than the water
company plans were drawn up. I think we have got
a bit of a mismatch between 25-year water resource
strategies, rolling programmes of five-yearly update
of water company strategies, and development
growth zones and growth points (which I think we
are going to call the new ones that are likely to emerge
on Monday) which are emerging at a dramatically
fast rate, so keeping up with that is proving to be a
problem. The two messages we were carrying into
ODPM really were we do need to look at locational
issues in terms of these developments. In many cases
if we get the right efficiency measures in we can see a
way of these measures going ahead without it being a
disaster to the environment because we can get the
right sort of efficiency reductions in water use, but
there will be some places where it simply will not be
possible to build more housing or to create more
development because we are at the level of capacity of
the system and even with efficiency measures we
would find it very difficult to agree that a
development should go ahead. We would want to
keep these to a minimum by proper forethought and
planning, but I think it has now been recognised with
ministers that we do need to find a way of getting
these three sets of plans in synchronisation.

Q217 Lord Taverne: You have mentioned one
obvious conflict between the needs of housing
development and the responsibilities of your own
organisation, and there are these enormous pressures
on the water companies to invest more, at the same
time as limiting the cost increases so there are built-in
conflicts in some ways between your demand for the
environment and the other economic factors at work.
How do you balance the needs of the environment
with the needs of people and housing and costs?

Baroness Young of Old Scone: This is a very
fundamental issue in all the work the Environment
Agency does because clearly we are not a blind
environmental body, we need to take account of
economic and social issues, and in the issue of water
resources that happens particularly through the
water price round where there are two sorts of
proposals that come forward in the five-yearly price
setting regime with the water companies. There are
schemes which are driven by statutory drivers
(generally European statutory drivers) where we
believe there already is a pre-existing commitment of
the Government to introduce these schemes. The
important thing there is to make sure they are done
in the most cost-effective way, and that is part of what
the economic water regulator should be achieving,
and we keep a close eye on that. There are other
schemes where full cost-benefit analysis looking at
the environmental economic and social costs needs to
come into play, but I think depending at what stage
in the price setting round we are and how jaundiced
I am feeling about it, there is generally a productive
tension between the water regulator, who is looking
at the needs of the companies and the needs of
consumers and ourselves, who are looking at the
needs of the environment, and the water companies
who are looking again at all three, and the tension is
reasonably productive in that with a push and a
shove we get the right range of schemes at the right
sort of price, but on bad days it can be a bit corrosive.

Q218 Lord Oxburgh: Do you interact directly with
the regulator from time to time?

Baroness Young of Old Scone: With the economic
regulator?

Q219 Lord Oxburgh: Yes.

Baroness Young of Old Scone: Frequently nationally
and regionally, and in fact many of the bits of process
in the five-yearly price round are done between us
jointly.
29 November 2005  Baroness Young of Old Scone, Dr David King and Mr Ian Barker

**Q220 Chairman:** Just to be quite clear, who in government therefore is responsible for arguing the case for developing new water resources to ensure security of supply? Who is responsible for ensuring security of supply?  

*Baroness Young of Old Scone:* I would say that it is the Secretary of State for the Environment who is responsible for ensuring security of supply.

*Mr Barker:* But each water company has a statutory duty to ensure supplies to its customers so it is the responsibility of every water company to develop a plan to ensure that it is able to fulfil that statutory duty. Clearly the Secretary of State for the Environment would and does take a keen overview in terms of the adequacy of those plans. Our reports to ministers make clear where companies are failing and we know that companies heed what is said.

**Q221 Chairman:** If a plan were deemed by the Secretary of State to be inappropriate for ensuring security of supply, the Secretary of State would have to go back to the water company, who in turn would have to go back to the economic regulator?  

*Mr Barker:* In a last resort, yes.

*Baroness Young of Old Scone:* I suspect the Secretary of State would go back simultaneously to both.

**Q222 Chairman:** But the Secretary of State cannot influence directly the economic regulator?  

*Baroness Young of Old Scone:* The Secretary of State does lay out environmental guidance for the price round and so the economic regulator is supposed to work within that, although on occasions that has been heavily debated.

**Q223 Lord Mitchell:** You have submitted some diagrams in your evidence and they show the lack of additional surface water and high levels of unsustainability of abstraction in the South East of England where these one million new homes are planned, and also of course the evidence from Defra shows an unexpected rise in household consumption. In your judgment how are we going to meet this increase in demand?  

*Baroness Young of Old Scone:* Our belief is that by increased water efficiency we can offset the additional number of new homes in the South East if we were to tackle that with some vigour, but there will be a need for some new resource development, and that twin-track approach is one that we have been promoting. We have been very clear with the water companies that there is absolutely no point in their coming to us and asking for blessings on new resource development until they show they have got their house in order in promoting water efficiency. We have been delighted that the Minister has recently set up a Water Saving Group which is going to put a greater focus on trying to break through some of the barriers to increasing water efficiency, both in the existing housing stock and in new build and in attitudes towards water consumption.

**Q224 Lord Mitchell:** Could I address the particular issues of increased reservoirs and also desalination. On the subject of reservoirs, do you support new reservoirs in the South East and what is your assessment of their environmental and social impact? If I could also talk about desalination, what is your position on the desalination project proposed by Thames Water for emergency supply?  

*Mr Barker:* Reservoirs are an important option for water companies to consider when they are balancing supply and demand and, as such, we recognise they have a part to play in that role. We believe that potentially some new resource development may well be necessary in the South East, but as yet no company has proved either the need or indeed that a reservoir is the right option in economic, social and environmental terms to meet that need, so they have a way to go yet within that. Reservoirs are environmentally damaging in terms of their immediate impact, disrupting flows, ecology, fisheries, and so on, and they also have a big impact on the land. The issues around desalination are energy use, the amount of waste salt and silt that they produce. In terms of Thames Water’s proposal, as you heard from Dr King earlier, they have a 200 megalitre a day deficit, and the only way of plugging that is through desalination as a rapid option but that is unlikely to get the company out of all its problems. The major issue for us around reservoirs is there is a belief that they are a certainty, that if you construct a reservoir you will get the yield you think you will, but it takes about 20 years from when a reservoir is a glint in a managing director’s eye to being constructed and full, and through that process there is no guarantee you will get the planning consent nor with climate change it will yield the amount of water that is required. That is why we believe companies should pursue a flexible approach, balancing small-scale developments with large ones and demand management to buy them some time and also to reduce overall demand for the future.  

*Baroness Young of Old Scone:* I think history will look back on the Thames issue and say that collectively the system should really have been a lot more robust with Thames over the last 15 years. It was until this last price round the company with the lowest prices and they used to boast about that on their bills, which used to upset me mightily. In spite of all the constraints to the work that it is doing in mains replacement that I mentioned before, we do not think it has done enough on persuading its customers to be more water efficient, on metering those parts of London that are not multi-occupancy tower blocks where there could be metering and with the results
you get from metering, and on more education and awareness campaigns. There is a lot that we will look back on and think we should not have got as close to the wire as we are with Thames now. As Ian says, at this point we are not going to create a reservoir quickly so we are working with them to examine that possibility and it may well be that we have got to live with a desalination plant in the short term.

Baroness Young of Old Scone: Certainly in the work we you get from metering, and on more education and awareness campaigns. There is a lot that we will look back on and think we should not have got as close to the wire as we are with Thames now. As Ian says, at this point we are not going to create a reservoir quickly so we are working with them to examine that possibility and it may well be that we have got to live with a desalination plant in the short term.

Baroness Young of Old Scone: Certainly in the work we have been doing on water company plans we have promoted the twin track approach for some time and we have pressed very much in successive price rounds for metering to be included as part of the price settlement and we have not been tremendously successful in that. We are now working as part of a Water Saving Group sponsored by Defra ministers to look at what the blockages to metering are and to really try and make much faster progress. I think we have been developing quite a consensus amongst all the players, with perhaps one exception, that now the time has really come when metering has got to be seen as a major weapon in reducing demand. I think the water companies themselves believe that, I think the economic regulator believes that, I know that ministers believe that, we certainly believe that, and I hope that we have got enough support round it now to look at the practical difficulties that are getting in the way. I do not mean universal metering right across the country because if you are in bits of Wales and bits of the North West it is pretty wet and metering is not appropriate, but in those areas where over the next few years we recognise there will be water scarcity we need to get metering programmes going forward very, very quickly. There are some major legislative hurdles in the way at the moment. In evidence in your written evidence ... we have not got the luxury of also note that the water companies' latest plans choosing any more. We have to do it in an efficient way to get moving through street by street, one after now and 2025. ... to do it fast. It gives people the price signal and incentive to do the right things by way of kitting out their houses with low-flow fitments and white goods because at the moment there is absolutely no incentive for water charge payers to do any of this because they do not know how much water they use and they do not have any benefit from reducing their water usage in their bill.

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Baroness Perry of Southwark: One of the difficulties of this kind of programme of metering is always the vulnerable groups, the people who may need to use water but perhaps are more concerned about cost than others. Do you have any thoughts about how that can be handled?

Baroness Young of Old Scone: We think that water metering in areas of water stress and scarcity can have major benefits for vulnerable households because if you get smart metering and smart tariffing you can give a big slug of water to poorer households at a very low cost and then ramp up to fairly fast rising prices for what I would call luxury items such as garden watering, swimming pools and some of the big users. We think that meters make it possible to get

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away from the rather regressive system that the current rateable value standing bill represents toward a much more individually-focused process that can do good to disadvantaged households.

Baroness Young of Old Scone: I am pleased to hear you say that.

Mr Barker: Yes.

Q229 Lord Oxburgh: Does smart metering to you mean meters that display much more readily than most water meters do how much water is being used and how fast?

Mr Barker: Water meters which can be read remotely facilitate a more flexible approach to billing based on a seasonal approach to use.

Baroness Young of Old Scone: We would quite like bills to say what people are using and what they can do about using it if it has gone up or down, smart bills that tell people what is open to them to reduce their costs as well as helping the environment.

Q230 Chairman: So what can the Environment Agency do to promote these smart meters?

Baroness Young of Old Scone: I suppose we are chief nag on this one really. We press government, we press the water regulator, we press the companies, and the complex system that we have described means that it is a sheepdog effect that has to take place. No single individual within the system can say it will happen. It has to be this amazing process of developing consensus. I believe that we have now reached a point, with very few exceptions, where metering in water scarce areas is absolutely fundamental and should happen quickly, preferably before the next price round.

Q231 Lord Howie of Troon: I am wondering how smart metering is, how does it work? You have said—and it is nice to see you there—that you differentiate between poor people using water and people filling swimming pools and so on. Does your smart meter do that or is it a matter of amount?

Baroness Young of Old Scone: Ian is probably better on smart metering but I think you have got to make a decision about whether you have got a large family with high usage because they have got some medical problem and are in receipt of benefits, for example.

Q232 Lord Howie of Troon: Yes, you might be watering the garden. Can your smart meter say that water is going into the garden and not into the teapot?

Mr Barker: It records the total volume of household use and would clearly record a swimming pool however many tens of cubic metres it did take.

Q233 Lord Howie of Troon: So it is based on amount, is it?

Q234 Lord Howie of Troon: So it is not that smart, is it?

Baroness Young of Old Scone: It is fascinating to think of the fact you could make meters a sort of big brother is watching you. It appeals to my nature no end!

Q235 Chairman: We hope to take evidence from those who have got more sophisticated systems in other parts of the world. Perhaps when we find some systems that do work we can report back to you and discuss them.

Baroness Young of Old Scone: Meters have one other benefit. If you ever want to play a good party game and you have a meter, my after dinner party entertainment is to take all my dinner guests out and stick their head down the hole where my meter is and make them listen, and it is absolutely silent. They say, “What are we listening for?” and I say, “You are listening for water leaks because if there were any on my premises that meter would still be running,” so we can help with leak protection by increasing use of meters.

Lord Howie of Troon: If I get invited I do not think I will come!

Q236 Lord Whitty: Can we move on to a different area which is really the regulatory framework you are moving into and how it relates to the pre-existing one. The end point of the Water Framework Directive is to have an understanding of what the definition is of good ecological status. Are you clear on what your understanding of that is and how soon that is likely to be defined in terms of precise targets? Specifically, will it fit in with the timetable for the next periodic review in 2009 and should there be some greater confluence between the river basin management timescale and the Ofwat five-year periodic review timescale?

Dr King: Good ecological status is made up of two components, biological and physical chemical status, and individual water courses whether you are talking about lakes, rivers or estuaries will be defined against the ability to support a reference set of biological indicator species and also the physical chemical parameters to support those species. For example, if you took a river in the Midlands like the River Avon, the expectation of its status would be associated with its ability to maintain coarse fish populations such as roach and rudd, et cetera, which would be different to a river in North Wales like Conwy which may be about supporting populations of wild brown trout which would have a much higher biological requirement. That is basically what is behind a good ecological status but it is a subject of significant debate still across Europe in an attempt to provide a
method and consistency of approach in the application in terms of the Directive. The expectation is that we will have that harmonisation and clear definition by 2006. The Framework Directive requires that we have river basin plans agreed by 2009 and within the river basin plans would be the programme of measures to retrieve the good ecological status. I think what one also has to remember is that this will be the first iteration of the plan in the Framework Directive which in fact goes out to 2027. I am sure we will not get everything right. The expectation we can use some of that resource in order to pick up some of the new requirements under the Framework Directive. The one thing I am pretty certain about is that we are not seeing the Government or the Chancellor coming up to us waving bundles of fivers at us on this one. So we are going to find ways of monitoring that make the best possible use of what we have got.

Q238 Chairman: Dr King predicts that the harmonisation might be agreed in 2006. Are you confident that the standards on which the EU Directive will be based for good ecological status will be based on rigorous science and not on a political fix?

Dr King: Certainly we are heavily involved in the debate on harmonisation and in the debate about good ecological status and we would certainly be advocating that the definition has to be based on sound science. What eventually emerges, of course, might be something different but the intention is to base it on sound science.

Q239 Chairman: Have we got the science in place to determine what is good science and what are appropriate standards?

Dr King: Yes, I believe we have. There has been an enormous amount of effort and research put in the UK but also across the Community on the issues. The Water Framework Directive is that an excellent Directive could get technically over-prescribed by chaps in anoraks from across Europe getting together with too much control, some of whom come from us.

Q240 Lord Patel: My questions relate to abstraction. You propose to revoke or restrict abstraction licences over 600 sites, therefore the questions are what do you think will be the consequences of this for the water industry and is it really practicable to do this in already stressed areas? There will be compensation costs related to this. Who will pay for that and what might be the cost for the consumers?

Mr Barker: There are some within the water industry who believe that we will march into their offices one day and take their licences away and leave towns without water. Of course, that is not the case. We have said many times that we will not destabilise public water supply and that where it is necessary to take action against a water company licence we will help them develop a new resource, but we will expect them to act with all speed to help deliver the Habitats Directive. It is important also to see these proposals within context. As a first phase of our Restoring Sustainable Abstraction programme we are looking...
at a number of sites which total less than 0.4 of a per cent of the total public water supply in England and Wales, and across the 600 sites if we in due course progress the whole programme it is only of the order of 2 per cent of the total amount of water in the public water supply, and that is within margins of error in companies' forecast demand over the next few years, so the context is important. We have been asked by the Government to fund this compensation which we may well need to pay. We have a legal obligation in this regard to fund this through our scheme of abstraction charges. As I mentioned, we have a first tranche where the cost is potentially up to £85 million to deal with abstraction licences, both public water supply, agriculture and industry, which are damaging sites of international conservation importance, and tackling those is the highest priority under the Habitats Directive.

Q241 Lord Patel: Will the consumer have to pay any cost? 
Mr Barker: Our abstraction charges are paid, as the name suggests, by all those who take water, and ultimately those costs may find their way through to water company bill payers, but as an overall proportion of water company costs they are very small.

Q242 Chairman: We referred earlier to the sins of your predecessors. Are you not the victim here of over-generous abstraction licences being granted when there was not, quite frankly, the water there to abstract, particularly in the summer? 
Mr Barker: Many of these licences, you are quite right Lord Chairman, date back to the mid-1960s when our predecessors had to authorise existing abstractions, and at that time not only did they have to be granted but also there was much less understanding of the amount of water which one needs to keep a river healthy and a wetland wet. Over the years our understanding has improved and many of those licences have been taken up to their full capacity, which is why we are seeing the problem we are today.

Q243 Chairman: If we are arguing about something which was a historical failure of policy you do in your evidence point out that you are protecting abstraction rights worth some £72 billion, so if that is the asset value held by people with abstraction rights and you are talking of under the Habitats Directive £450 million having to be spent to buy up these rights, it is not a large sum compared to that £72 billion but it is absolutely essential if you are going to do your job properly. I am not arguing your case with the Treasury for you but is there not a case for saying it is over and above your normal requirements for funding your operation?

Baroness Young of Old Scone: There was a large amount of debate about where the compensation money would come from. There were a variety of possibilities. It could have been added in to water charge payers through the price round and been recouped in that fashion. It was decided it was not going to be done that way. It was felt that the best way was, in fact, to put it as a charge against abstracters on the basis that that reflected the true cost of water to the abstracters, but you could say this is such a major sum of money that we need to seek it from grant in aid and the public purse, but I suspect we would not get much shrift on that one, although that may change because of course the amount that we are proposing, £85 million, as a first stage is only a first stage and Europe will be extremely interested in whether the next stage follows.

Q244 Chairman: When regulators make a mistake which is apparent later the costs can be very high. We are all too well aware of many cases. This is not one which apparently government in its wider manifestation has accepted was a mistake, but clearly I would take a different view, but it is none of my business.

Baroness Young of Old Scone: Certainly if formal infraction follows and the Government is faced with a daily infraction bill that can be a pretty expensive pastime as well.

Q245 Lord Howie of Troon: If you do not intend to restrict the public supply, which supply do you intend to restrict? 
Mr Barker: We may need to restrict some public supplies—

Q246 Lord Howie of Troon: You said you would not. 
Mr Barker: We will give companies the opportunity at the time to find the resources for other classes of abstracter—industry and agriculture. We have yet to see how this compensation will play out and what we will be looking for is opportunities which so far as possible will allow people to continue their business. That might be using the water which they take but much more efficiently so that overall they take a lower volume, and overall that might be the most cost-effective solution.

Q247 Lord Howie of Troon: Have you a set of priorities? 
Mr Barker: That is something we are about to embark on on a trial basis over the next year or 18 months. This the first time this legislation has been used, although it has been in force for 40 years, so we need to work through with those who are affected, how it will work and how the compensation process will evolve.
Q248 Lord Howie of Troon: There might be some restriction on the public supply?  
Mr Barker: As I said, we would need to ensure that the public water supply is not destabilised and that companies can continue to maintain supplies to their customers.

Baroness Young of Old Scone: Across the country we are involved in drawing up a comprehensive set of catchment abstraction management strategies which are an opportunity on a rolling basis to look at all the abstractions around a particular catchment and to take a view about where the pressures are and what the competing needs are and the relative priorities, and where we can get increased elbow room, as it were, from improving the efficiency of some of those users so they can give up some of their more damaging abstractions. If you just take agriculture as an example, spray irrigation is notoriously wasteful. If we were to move over to more efficient methodologies, to improve different cropping patterns, a variety of choices that are lower in water use, we can see ways of farmers continuing to grow crops, feed the nation, and make a living but not necessarily using quite so much water. That is the sort of smarter solutions we will be looking at.

Q249 Chairman: Yet you have forecast that agricultural abstraction will increase?  
Baroness Young of Old Scone: It is difficult to know what is going to happen in agricultural abstraction. Climate change will drive it up but will farmers with the single payment react in very different ways to future markets and what will happen about improved technologies? Defra has got a programme of research going on to try and improve irrigation technologies, and if climate change really does become a major issue it will be impossible to envisage the sorts of crops remaining absolutely the same. Farmers will inevitably move to things that are easier to grow in hotter, drier climates and I suspect that we will all see some quite smart variety development in plants in order to make plants more drought resistant. There will be a whole load of issues that will come up and I think that makes it difficult to really predict what will happen in agriculture. On the face of it, bearing in mind what has happened over the last two or three hot summers, we will see an increase in summer use.

Q250 Lord Howie of Troon: I will not ask you what you think about dewatering of quarries because I already know the answer to that.

Baroness Young of Old Scone: I am sure that many copies of Hansard have been sold on the back of that.

Q251 Baroness Platt of Writtle: When you specify that certain standards should be applied to discharges into water systems, do you also consider how the introduction of technologies to control water pollution may be simply transferring problems from water to air through increased energy use?  
Dr King: When we regulate industry we do so under different pieces of legislation, so most major industries legislated under what is known as pollution prevention and control legislation, and that requires the company to look at the best available techniques. Built into the permitting system there is a safeguard to ensure that you are not transferring pollution from one medium to another. So clearly within that permitting system there are safeguards and indeed one of the reasons for the Agency being created in the first place was to have this integrated approach.

Q252 Baroness Platt of Writtle: With water and climate change?  
Dr King: Clearly when we are regulated under the Water Act then it is a different piece of legislation and that is purely about a discharge consent, but we also have the opportunity where our officers have discussions with water companies about waste minimisation and about resource efficiency in the round, and clearly as part of that then we would be encouraging companies to ensure that they are not, as I said, transferring from one medium to another.

Q253 Baroness Platt of Writtle: And are you satisfied with the scientific analysis behind the Priority Substances Directive and how much would it cost and is it realistic?  
Baroness Young of Old Scone: I think the Priority Substances Directive is in a bit of a shambles at the moment.

Q254 Baroness Platt of Writtle: Do you? Right.

Baroness Young of Old Scone: It is two years behind schedule. There does not seem to be a way through to getting agreement between Member States at Commission level, and of course there is a sunset clause in this that says if Member States cannot agree at Commission level they eventually have the right to set their own standards for priority substances. Whether that is a good thing or a bad thing I do not know, quite frankly. It does seem a shame we cannot get a European standard and the one that we have contains no de minimis level for some of these priority substances and that means that it is about not letting them into rivers and water bodies at all rather than not letting them in at a level that we do not believe would have an impact on human health or the environment, and that is a very, very difficult thing to control. So at the moment we are still watching with interest the European process to see what will emerge and with Defra helping put pressure on in Europe to make sure we get a satisfactory outcome.
Baroness Young of Old Scone: I do not think the Groundwater Directive is one that we would worry about so greatly. Clearly, at the moment, the major pressure on groundwater is not necessarily quantity (although that is an issue and we do need to make sure in the twin-track approach of resources and demand management that we very much take account of the fact that I think it is about a third of the water supply comes from groundwater and that we need to keep an eye on the protection of that resource) the most important thing is to protect the quality of the groundwater resource because at the moment, generally speaking, if groundwater becomes contaminated it takes a very, very long time for that contamination to clear and it may never clear, so the important thing is not to allow levels in contamination of groundwater to rise. At the moment, diffuse pollution, particularly from land management and agriculture but also runoff from built development and from roads, is the major threat to groundwater. And there again we want to see a variety of measures taken to try and minimise that: a whole raft of measures with farmers around catchments to try and diminish the amount of nutrients and pesticides that go into the water courses as a result of their management practices; work with the Highways Agency to reduce the amount of runoff from the roads; but more particularly trying to get some long-term surface water drainage and sewerage plans put together by the water companies and local authorities so that we can get a much more systematic approach to the management of surface water, drainage and sewerage. At the moment our sewers are elderly, they leak, they cause contamination and quite a lot of surface water connections are wrongly connected into sewers. There are over one million wrong connections and also there is quite a lot of contamination from surface water runoff straight into water courses. So there are quite substantial issues for groundwater contamination that we need to handle. I do not think the Directive is necessarily a major issue for us. I think the biggest issue is the environmental quality of our groundwater.

Baroness Young of Old Scone: We just do not quite understand how it is going to be managed practically as a Directive if there are no minimum levels. It means that we have to be worried about any amount of that priority substance going into water courses, rather than a detectable level once it is in a water course, because the Directive will not say that what we have got to worry about is any health-related level within the water course or any level of detection within the water course, it will be any of that substance going into the water course. We are really quite worried about what that means in terms of investment and how practicable it is. We have remarkably few levers to be able to influence all of those discharges into water.

Chairman: There have been many examples, have there not, coming out of Europe of inappropriate requirements which have distorted capital expenditure to the disadvantage of other parts of the environment. I think you are alerting us to the fact that this might be one of them. Baroness Sharp?

Baroness Sharp of Guildford: You have called for the establishment of an independent Water Saving Trust which would, you reckon, cost somewhere in the region of £10 million to £15 million per year, and I gather that this is a move that Ofwat currently opposes. What do you see would be the advantages of such a body particularly, given the existence already of waterwise and other such groups, and how will it provide value for money?

Dr King: You will have heard already from Barbara that water efficiency is an essential component of how we meet future demand against the background of climate change and indeed increased population in households. I think the concept of water efficiency and water saving is accepted by all. However, we believe that there needs to be a step change in the way that we approach water efficiency, and we think that the model and the achievement of the Energy Saving Trust has demonstrated that where you have a body that has a focus on promotion and implementation of efficiency that it works well. We think that the Water Saving Trust could be such a body where it would not only be about education and informing people but also would be able to help people in their homes through grants, etcetera. So we do believe that there is a real opportunity for a step change in efficiency there. We fully support waterwise but waterwise has a different brief. Waterwise is largely about research and development and large-scale trials. This would have a different focus and we think it would be well worth while and the £15 million a year would potentially help anywhere between 20,000 to 60,000 houses, and in the overall context of water resources and the future needs it is good value for money, in our view.
Q258 Baroness Perry of Southwark: Do you see the new Water Saving Group as being something that is happening instead of what you have asked for or would it be as well as?

Dr King: As well as. There are clearly a number of folk that are working on water efficiency and certainly the work that waterwise will undertake will contribute to that, but it is largely focused on evidence collecting which is important but we also think that there is sufficient evidence now to act, and we would like to see something that puts momentum into it, so we would see it over and above that. In addition, waterwise was set up, I think I am correct, with a five-year life.

Q259 Baroness Perry of Southwark: But of course waterwise is represented on this new Water Saving Group, is it not?

Baroness Young of Old Scone: I think the important thing about this group is that it must be about action and not about analysis. The risk is that we continue to plough over the furrows and do not actually find ways of breaking down some of the barriers to progress so far, and that is why we are particularly pressing the metering issue where we believe that it is vitally important that we get a commitment to metering in areas of water stress before the next election when it becomes too difficult again. I think there is a period between elections when taking a bold move is something that we can all live with and then as it gets closer to an election a bold move seems less possible. To be frank, I think we have agreed on getting a very real commitment going and into action now. I hope that the Water Saving Group will promote that and will not become an alternative to action.

Q260 Baroness Platt of Writtle: How do you work with industry to help them reduce their water usage and manage dangerous substances in their processes? What options are available in terms of on-site waste treatment and resource recovery?

Mr Barker: We have an important role as a regulator and also as an influencer. If I can begin by talking about our regulatory role, clearly where industry is taking water directly from the environment through an abstraction licence we work to ensure that the water is being used efficiently, and we do that both directly at the time of the grant of the abstraction licence and then also as we progressively enforce it. Our other regulatory role is in terms of the pollution prevention and control regulations where we work with different types of industry to ensure that they are operating efficiently across all the resources which they use on the site, including water, and again that they are operating efficiently and that helps them ensure that, for example, dangerous substances use and discharges are minimised. As an influencing role—and Barbara called us chief nag earlier and we probably have that role also in this regard—we work with water companies and with other industries promoting the value of water efficiency and resource efficiency across a whole range of processes. We hold water efficiency awards every 18 months or so to showcase best practice. For example, our last industrial winner was a small brewery which reduced its water use by 25 per cent and is now amongst the best in the country in terms of water use, so it saves not just water but chemical use, power and energy and overall improves its bottom line. The same with the water industry itself where many water companies do work with their big water users but we would like to see them doing more with some of their small and medium-sized customers to promote the values of water efficiency.

Q261 Baroness Platt of Writtle: In your evidence you call for independent advice from an organisation which specifically has a remit to help companies save water. That might be duplication after what you have just said but what form would such a body take and how would it be funded?

Mr Barker: There is currently an organisation called Envirowise funded by the Government which does work mainly with large industry again across the whole resource use. We work closely with them but we would like to see them be able to reach a wider section of industry and small and medium-sized enterprises as well. That would be a neat complement to our proposal for a Water Saving Trust which would largely be about domestic use and Envirowise could continue to tackle the non-household, the industrial use.

Q262 Lord Taverne: Would you need separate organisations? Could this not be part of the duties of the Water Saving Trust?

Mr Barker: That is something we would have to look at potentially currently within energy.

Baroness Young of Old Scone: The model within energy is quite interesting. We have got the Carbon Trust dealing primarily with business and the Energy Trust dealing on the frontline with households, but there has been a question as to whether we need two in energy. The other question is do we need one for water and one for energy? The model is the same for water and energy so maybe we just need a resources efficiency body that covers the two.

Q263 Lord Whitty: Can we go back to agriculture. We have spoken a bit about agricultural use of water and I have got one question on that, but we have not spoken to any great extent about diffuse pollution. Do you think, given that agriculture is on the one hand one of the most overregulated industries (that is probably subjective) but on the other hand at the
same time paradoxically escapes quite a lot of regulation, have we got the right framework for controlling diffuse pollution from agriculture, or will we have as the Water Framework Directive goes on, and can we really control it on the basis that the responsibility and to a large extent the cost will fall on individual farmers, whereas you actually need to manage a total catchment area in relation to diffuse pollution?

**Baroness Young of Old Scone**: Diffuse pollution from agricultural and land management generally is going to be a big issue for us as part of the Framework Directive because it really highlights it. If you look at our risk maps, they have mapped the various risks around each water catchment and you can see clearly in a very visual way just exactly what the impacts are. For a very large number of them they would fail the Water Framework Directive as a result of diffuse pollution from land management. The framework that we need to use is one that we need to use for improving all of the environmental management from agriculture by farmers and that is a whole basket of different instruments, some of which we already have, some of which we would need. We have already got incentives through the agri-environment schemes. We have got cross-compliance under the Single Farm Payment where in order to get your Single Farm Payment you have to meet minimum environmental standards, and we have got a number of Directives already in place in areas like nitrate vulnerable zones and sewage sludge. The model that we are very much promoting is one of groups of farmers around the highest risk catchments coming together with advisers to look at what the issues are and to really focus on the highest priority changes that they need to make. Some of these changes will be ways in which they can save money and you can provide a lot of information to farmers about how to make their farm business more profitable and do good to the environment, particularly to reduce their diffuse pollution. Some of them, however, will not be of that nature and they will actually require fairly heroic changes in farming practice, and I think that is quite a long way down the line and we do need to think about how we handle that. We are not talking about wholesale change in the farmed landscape but there may be some places where, quite frankly, in a very sensitive catchment we may need to see farming alter quite dramatically. There is of course quite a lot of talk about whether we do need additional instruments, and a nutrients tax for example might be one way of heralding through the price system the need to really reduce the amount of artificial nutrients going on to the land in order to avoid excess run-off into the water courses. We also need to look at some of the pesticides issues we are seeing. For example, sheep dip in Wales is having a dramatic effect on the river systems. We need to look at new technologies and new methods for dipping sheep and possibly the development of new products or even new veterinary approaches, so there is a whole basket of instruments that is going to have to be applied to the farmed environment. The important thing is let's get a bunch of farmers around the catchment which makes sense to them with a knowledgeable adviser to work out what the issues are and what needs to be happen, and then to give support through all of these instruments to make that happen.

**Q264 Lord Taverne**: If you are concerned, as you obviously must be, about field drainage and pesticides and nitrates, should you not therefore be encouraging farming methods that lead to low till and no till agriculture which reduce the use of pesticides? Should you therefore not be strongly lobbying for the commercialisation of GM crops which have been shown to result in low till and to enable no till agriculture and which have shown dramatic reductions in the use of pesticides?

**Baroness Young of Old Scone**: There is a bundle of issues in there. No till/low till may have their place in some catchments. One of the things we have got to watch is low till and no till in areas which already have substantial panning and compaction, because I think we will rapidly as the Directive goes through understand just how pervasive panning and compaction already is in many catchments—unknown to farmers. It is amazing how deep some of this has gone. Secondly, we do need to look at all other ways in which we can reduce the amount of nutrients and pesticides going into the water courses—GM, organics, a whole variety of technologies. I think the big argument with GM crops is not whether they reduce tillage and reduce the amount of pesticides and herbicides but whether they inadvertently have an impact on bio diversity and I think, to be frank, in spite of the field trials, the jury is still substantially out on that. I am on record as having said we need to test every new GM variety of that nature and they will actually require fairly heroic changes in farming practice, and I think that is quite a long way down the line and we do need to think about how we handle that. We are not talking about wholesale change in the farmed landscape but there may be some places where, quite frankly, in a very sensitive catchment we may need to see farming alter quite dramatically. There is of course quite a lot of talk about whether we do need additional instruments, and a nutrients tax for example might be one way of heralding through the price system the need to really reduce the amount of artificial nutrients going on to the land in order to avoid excess run-off into the water courses. We also need to look at some of the pesticides issues we are seeing. For example, sheep dip in Wales is having a dramatic effect on the river systems. We need to look at new
areas where there is a pretty high historic level of diffuse pollution.

**Q265 Chairman:** Have you been able to develop any pilot schemes to try to demonstrate to farmers how in a catchment area or sub-catchment area they might work together and is there any optimism arising from these trials?

**Baroness Young of Old Scone:** There are a number of pilots going on under various headings. Defra runs some pilots and is about to promote its diffuse pollution pilots—I cannot remember what they are called. sustainable something or other—starting in the spring. We are already running four pilots jointly with the NFU and English Nature. As many as there are catchments there are odd pilots around, sometimes with the statutory bodies, sometimes with voluntary organisations, sometimes with the farm advisory system. I think the important thing is that we find a way of getting groups of farmers together in pilots and then roll it out to the highest priority catchments fairly swiftly and that we use whichever advisers farmers find most attractive and are most comfortable with. An important part of this process is going to be getting the multitude of advisers that farmers seek advice from all singing from the same hymn sheet in order to deliver the Framework Directive and a reduction in diffuse pollution. That is not going to be an easy job because some of the advisers are very much from the commercial agronomy side, some of them are from farming and wildlife advisory groups, some of them come from us, some of them come from English Nature, some of them come from the Rural Development Service, so we have to get that harmonised. The one other factor we need to take account of is supermarkets. Supermarkets have got off Scot-free for too long in demanding particular standards from farmers without really taking account of the downstream effects of that and we have really got to start by getting the supermarkets to understand exactly what their purchasing decisions are doing to the environment, both in terms of water and in terms of diffuse pollution.

**Q266 Lord Patel:** You have partly started answering this question which relates to better sewerage planning and surface water drainage. You clearly have a view about this; are you working with the water companies on this?

**Dr King:** There are tens of thousands of kilometres of sewerage networks and drains and, as you have already heard from Barbara, a legacy of underinvestment, which results not only in waste water leakage but also in hydraulic overload and that causes flooding. Flooding from sewers and surface water drainage is costly and of course is highly distressing to the folk that it happens to. It is often hard to attribute responsibility when it comes to that type of flooding because there are a variety of players that have a responsibility, for example the Highways Agency, local authorities, private individuals, sewerage undertakers, and indeed ourselves, and it is our view that a property owner expects a joined-up approach to flooding from draining and sewerage and at the moment there is no long-term planning or strategic framework and there is very poor data, etcetera. I think this was recognised by Defra in drawing up its flood risk management strategy, *Making Space for Water*, and indeed in the implementation of that strategy there is a work stream which is now looking at how such a framework would be set up, and also with a view to setting up a few pilots that would try to bring together what they would call integrated drainage partnerships to address these issues to see how it might be done going forward. There are some examples where it is reported that it works reasonably well. Glasgow is one of them and Birmingham also has integrated drainage plans. It is an extremely complex issue and will take some time to sort out but we are certainly addressing it.

**Q267 Lord Patel:** Is the Agency taking the lead on this?

**Dr King:** We are not taking the lead but we are actively involved with Defra in progressing it.

**Q268 Lord Taverne:** Just one final broad question. How come that the water availability per person in the South East is so much lower than it is in the southern Mediterranean countries where they have a much lower rainfall?

**Mr Barker:** It is the combination of relatively low rainfall in the South East of England coupled with a very high density of population. The two figures combined mean that per person there is very little water, as indicated in our evidence.

**Q269 Chairman:** We have been given the figures often enough we are beginning to believe them, but I think Lord Taverne is right to challenge these figures because sometimes these are assumptions that do need to be looked at carefully. We have come to the end of our questions, is there anything more you wanted to add?

**Baroness Young of Old Scone:** There is one area we have perhaps not focused on sufficiently and that is the whole business, going back to the Sustainable Communities Initiative, of the housing issue. There are a number of developments that we would like to see promoted fairly quickly. We think there is a real opportunity providing that it can be gripped. One is that for about 18 months now there has been a proposition for a Sustainable Buildings Code which would introduce standards for water use and energy
use and waste management into new buildings. It would be a voluntary Code but the Government would require it to be used where there is substantial public funding. We really think that the standards within that need to be pretty robust and there needs to be a proper process for implementing it to make sure when buildings are publicly funded the code is used. It needs to be accompanied by an improvement in the building regulations so far as water efficiency is concerned so that all new buildings and all substantial extensions would need to meet at least a minimum level of water savings. We think it also needs to be accompanied by changes to the water fittings regulations, which means that every time you went into B&Q to buy a shower head or a new cistern or to do your DIY at the weekend, and every time a small builder went into a builders’ merchant he could only buy a water-efficient appliance or a water-efficient set of fitments. We believe these three things, a Sustainable Buildings Code which would be above the basic regulatory level and the building regs and the water fitment regs, all need to be tackled simultaneously. We know the ODPM is interested in this. We just feel that their interest needs to be expressed soon because we have been waiting for quite a while.

Q270 Chairman: One of the things we are being told time and time again is that power jets are now becoming ever more popular and they are formidable users of water, more so than baths. Would it be an oxymoron to describe a power jet as being “sustainable”? Baroness Young of Old Scone: There are ways in which you can engineer showers so that they feel effective without necessarily being water guzzling, but certainly the traditional power shower, particularly if you are one of these strange people who stands under the shower for hours on end, can be much more water consumptive than a bath. We do, of course, say “save water; shower with a friend”, which can halve the use. Chairman: I think on that note we had better finish! I went into B&Q to buy a shower head or a new cistern cannot anticipate the way this Committee will determine its brief, but I am sure that it will wish to follow up your point about changing the culture on water use because clearly the evidence which has been given to us time and time again is that something has got to change. There are other communities around the world who do take more responsibly their use of water, which we can perhaps learn from. So thank you for those helpful indications that you have given us and thank you indeed for all the evidence Mr Barker and Dr King have given us up to now. Thank you.

Supplementary memorandum by the Environment Agency

WATER SAVING GROUP

The inaugural meeting of the Water Saving Group took place on 20 October 2005. This high level group, chaired by Environment Minister Elliot Morley, includes members from the Environment Agency, Ofwat, the Consumer Council for Water, Water UK, Defra, the Office of the Deputy Prime Minister and waterwise, the water industry’s new water saving body.

The group has been established to deliver a plan of action to cut down water usage and encourage householders to use water more efficiently. The Environment Agency is not against new water resource development and some will be needed, but the twin track approach of both resource efficiency and resource development is important.

It is essential the group works to redress the balance. We welcome the Water Saving Group and its focus on water efficiency. It must be action orientated, and all stakeholders must fulfil their duties and responsibilities to secure more efficient use of water.

We are pleased to play a key role in taking forward action for increased metering in water stressed areas.

The Action Plan will consider the role of metering and the process for designating areas of water scarcity and:

— Review evidence on the effect of metering on household consumption.

— Assess the potential contribution to water efficiency from the projected application of current metering policy.

— Carry out a “lessons learned” review of the current application for water scarcity status.

We are supportive of the move to promote water efficiency in new buildings and development, but still feel that more needs to be done to tackle excessive water use within much of the existing building stock.
29 November 2005

Retrofitting cost effective water efficiency measures in existing buildings can provide enduring reductions in consumption.

We will also work to develop targets and benchmarks for household and water company water efficiency.

Further supplementary memorandum by the Environment Agency

QUESTION

Is a Priority Substances Directive acceptable if the greenhouse gases are anything like as severe as Yorkshire Water suggests—especially if there is insufficient evidence to show that the reduction or removal of the substances in question is of significant benefit to human or environmental health.

ENVIRONMENT AGENCY—REPLY

The Priority Substances Directive is still under negotiation with the Commission. We are expecting proposed levels to be at least as low as those in the existing Dangerous Substances Directive. It is difficult to comment on Yorkshire Water’s projections without details of the underlying assumptions, for instance, whether or not they have made any provision for possible technological advances in treatment or control of emissions at source rather than in STW. The Environment Agency is concerned that extremely low levels proposed for some substances would be disproportionately expensive to treat and could lead to excessive energy consumption. Prior to any transposition of the Directive into England and Wales legislation, a Regulatory Impact Assessment would be required and thus these costs would be revealed.

A formal proposal for a Daughter Directive under Article 16 of the Water Framework Directive has not yet been adopted. This should have been in place by December 2004 but has fallen further behind schedule. We believe that a revised text has now been circulated as part of the EU Inter-Service Consultation arrangements and that this will be officially adopted in February or March 2006.

31 January 2006
TUESDAY 6 DECEMBER 2005

Present

Broers, L
Howie of Troon, L
Lewis of Newnham, L
Mitchell, L
Perry of Southwark, B

Platt of Writtle, B
Selborne, E (Chairman)
Taverne, L
Whitty, L

Examination of Witnesses

Witnesses: Dr Chris West, Director, UK Climate Impacts Programme, Dr Nick Reynard, Risk Analysis and Modelling Group, Centre for Ecology and Hydrology, and Dr Dave Griggs, Director of Climate Research, Hadley Centre, examined.

Q271 Chairman: Good afternoon, gentlemen. Thank you very much for joining us today. There is a note of information that gives our respective interests and the purpose of the inquiry available. I wonder whether Dr Reynard and colleagues would like to introduce themselves.

Dr Griggs: I am David Griggs. I am director of the Hadley Centre for Climate Prediction and Research at the Met Office.

Dr Reynard: I am Nick Reynard. I am head of the Risk Analysis and Modelling Group at the Centre for Ecology and Hydrology.

Dr West: I am Chris West, director of the UK Climate Impacts Programme at Oxford University.

Q272 Chairman: Thank you. Is there anything you would like to say by way of introduction before we launch into our questions? Shall we go straight in?

Dr Reynard: I think so.

Q273 Chairman: Could you tell us what predictions climate models make for changing weather patterns across the United Kingdom and over what timescales? In particular, what will be the effect on rainfall and therefore on available water resources?

Dr Griggs: The latest official scenarios that we have produced in the UK are the ones that were produced for the UK Climate Impact Programme in 2002 which predict that we are likely to get wetter winters in the UK but drier summers. There is a lot of uncertainty in those predictions because different climate models show different patterns of rainfall over the UK. Hence, when we produce the next set of scenarios which we are already in the process of producing for 2008, we will use a much more probabilistic approach so we will be able to put probabilities of different increases or decreases in rainfall onto those. The latest models since the UK Climate Impact Programme in 2002 seem to produce a relatively small annual change of plus or minus 10 per cent. That hides a lot of regional difference and a lot of difference between the summer and the winter, with the winters getting wetter and the summers getting drier. That is probably the easiest way to sum it up.

Dr West: There is also an indication that more precipitation will fall as extreme events than at present, particularly in the winter time; less obviously so in the summer.

Q274 Chairman: Have the changes which you have monitored over the last decade or so borne out the projections for the future?

Dr Griggs: They are certainly consistent with the predictions that we have for the future. Obviously there is a lot of variation in the rainfall from day to day, week to week, month to month, year to year so it is very hard to draw trends. Some of the trends that you can draw out I can run through quickly. The growing season for plants in central England, for example, has lengthened by about one month since 1900. The temperature of central England has increased by about one degree Celsius during the 20th century.

Q275 Lord Mitchell: Is this gradual or is it spiky at all?

Dr Griggs: It is spiky. You get warm years and cold years; you even get warm decades and cold decades. Gradually over the century there has been a trend of about a one degree Celsius increase in temperature over central England.

Q276 Lord Broers: May I ask what are the error bars over the UK. Hence, when we produce the next set of scenarios which we are already in the process of producing for 2008, we will use a much more probabilistic approach so we will be able to put probabilities of different increases or decreases in rainfall onto those. The latest models since the UK Climate Impact Programme in 2002 seem to produce a relatively small annual change of plus or minus 10 per cent. That hides a lot of regional difference and a lot of difference between the summer and the winter, with the winters getting wetter and the summers getting drier. That is probably the easiest way to sum it up.

Dr West: There is also an indication that more precipitation will fall as extreme events than at present, particularly in the winter time; less obviously so in the summer.

Q277 Lord Taverne: On the question of extreme weather events, as I recollect, the technical section of the IPCC report, the third assessment report, said there was not sufficient evidence to link global warming with extreme weather events and yet one hears an awful lot at the moment which seems to make the link. Has opinion changed on that?
Over the last few years, that trend has continued. I do not know exactly where that trigger point is. While Dr. Griggs:

Lord Taverne: Q279

change although the data is somewhat sparse. Thermohaline circulation has weakened by about 30 per cent. However, those data points are a long way apart and thermohaline circulation, if models are to be believed, has a lot of variability. If you just pick four points along the curve on something that is variable, you do not know whether you have hit the high or the low points. Clearly further work is needed. What Bryden has found is very important and what we now need to do is to go out and take more measurements and find out whether there is a trend, which would be very worrying, or whether it is just that they hit the data points at the wrong points in the variability.

Models are starting to show that much more robustly. There have been a lot of tropical cyclones this year and what everybody would like to know is: are tropical cyclones linked to climate change? There seems to be little or no evidence that the frequency of tropical cyclones has changed as a result of climate change although the data is somewhat sparse.

Q278 Chairman: You therefore signed up to that statement, did you?
Dr Griggs: I was one of those who did, yes. It depends on what extreme events you are talking about. For things like small scale extreme events such as very localised storms or lightning, it is below the scale at which the climate models can represent it. We could not really say anything about those. At that time, there were just some indications that some more precipitation is falling in intense precipitation events. Over the last few years, that trend has continued. Models are starting to show that much more robustly. There have been a lot of tropical cyclones this year and what everybody would like to know is: are tropical cyclones linked to climate change? There seems to be little or no evidence that the frequency of tropical cyclones has changed as a result of climate change although the data is somewhat sparse.

Q279 Lord Taverne: You get Atlantic cycles irrespective of global warming?
Dr Griggs: That is right. We do not have enough data to be able to pick out a trend in that. Increasingly there does seem to be a trend towards higher intensity of tropical cyclones potentially as a result of climate change.

Q280 Lord Taverne: There seems to be a lot of difference in the United States between views. Emanuel takes one view and the Colorado people take quite a different view. Is there now a gradual consensus growing that it has been the extra warming of the Atlantic which has been responsible for the severity of storms, not their frequency?
Dr Griggs: There is growing evidence but there is not yet a consensus. It still needs further work but there are more and more indicators pointing towards that.

Lord Lewis of Newnham: We were given a copy of your Uncertainty, Risk and Dangerous Climatic Change paper in which you in a sense dismiss the whole concept of directly affecting the Gulf stream and yet recently I see in the press we have been told that there is a significant effect on the Gulf stream. I am not at all clear whether that is something that is cyclic, that has occurred before, or whether this is something that we do not have data for but it does raise the other major issue, as far as I am concerned, and that is what about methane hydrate and the whole effect of methane hydrate? If one were to get a significant amount of methane being liberated by a methane hydrate problem, then we are in for an even greater problem than global warming.

Q281 Chairman: Perhaps you could also give us your views on Dr Bryden’s report from the Southampton Oceanography Centre.
Dr Griggs: The potential for a shutdown of the thermohaline circulation is one of those events which we classify as low probability, high risk. There is a low probability that it will happen but if it happens it has a very high risk and consequence. There are no sophisticated climate models which suggest that thermohaline circulation will shut down during the 21st century. They all predict that it will either be maintained or that it will reduce in intensity but not collapse. However, we know from past history—most recently about 8,200 years ago—that thermohaline circulation has shut off in the past. We do not know exactly where that trigger point is. While none of the models shows it, it is something which is not yet fully certain. It could happen although we think it is unlikely. The recent paper by Bryden shows observations of thermohaline circulation that have been made over the last 40 years but they only have four data points. The last two seem to show that thermohaline circulation has weakened by about 30 per cent. However, those data points are a long way apart and thermohaline circulation, if models are to be believed, has a lot of variability. If you just pick four points along the curve on something that is variable, you do not know whether you have hit the high or the low points. Clearly further work is needed. What Bryden has found is very important and what we now need to do is to go out and take more measurements and find out whether there is a trend, which would be very worrying, or whether it is just that they hit the data points at the wrong points in the variability.

Q282 Lord Lewis of Newnham: What about the methane hydrate problem?
Dr Griggs: That is another one of those low probability, high impact events. That is even less well understood than the thermohaline circulation. The potential for the release of methane hydrates from both permafrost and from the deep ocean is something which is an area of very active research but one which is really not fully understood.

Q283 Baroness Perry of Southwark: You mentioned that over the last century, although there had been from start to finish a one degree increase in the temperature, there had been warm decades and cold decades and it was not consistent. Do we know whether that has been repeated in previous centuries? Has there been a golden age when it was very warm for a century before or an ice age when it was very cold for a century? Is this genuinely a new trend?
Dr Griggs: There have been warm periods and cold periods in the past, particularly the ice ages. What is different is the rate of change. The rate of increase of
6 December 2005

Dr Chris West, Dr Nick Reynard and Dr Dave Griggs

The socio-economic aspect to this is that the ice age cycle takes place over 10,000 years and probably the last 440,000 years. To give you an idea, the ice age cycle takes place over hundreds of thousands of years. What we have seen has just taken place over 100 years. It is the rate of change rather than the magnitude which I believe is very unusual. The nineties were the warmest decade in at least the last 10,000 years.

Q284 Lord Taverne: You mentioned that you are going to give greater probabilities to different scenarios in your next report. What is the degree of confidence you have at the moment in your predictions? Are they getting more sophisticated all the time? One gets the impression that the models seem to be inspiring more confidence as time goes on. What are the main uncertainties that still exist? How much attention should we pay to those?

Dr West: The uncertainties are still very significant. The temperature that we have seen over the last century is greater than anything we have seen at least for the last 10,000 years and probably the last 440,000 years. To give you an idea, the ice age cycle takes place over hundreds of thousands of years. What we have seen has just taken place over 100 years. It is the rate of change rather than the magnitude which I believe is very unusual. The nineties were the warmest decade in at least the last 10,000 years.

Dr Griggs: In terms of the climate models themselves, they are becoming more and more sophisticated all the time. We started in the 1970s with just models of the atmosphere. Then it became models of the atmosphere in the ocean and then the atmosphere of the ocean and the land surface. We included things like aerosols, the carbon cycle, ocean biology and chemistry. Increasingly they are becoming what are known as earth system models where we try and model important interactions and processes within the earth’s system, but they are by no means perfect. The super-computing that would be required and the grid scale at which we divide up the planet is still of the order of 100 kilometres so there are still many things that happen at sub-grid scale, at scales of size below the scale of the models. We have to try and parameterise which is to give an indication of what the bulk properties of a process are on that grid scale rather than model the process itself. More and more processes are being modelled and the models are becoming more and more sophisticated. There is absolutely no question that they are becoming better representations of reality but just because they are better representations of reality does not mean that they give you better predictions because the previous model could have given you absolutely the right prediction for the wrong reasons.

Q285 Lord Taverne: What impressed me about your report was the fact that you listed a number of things you said you did not really know all that much about, like aerosols, solar spots, solar activity and the impact of clouds. Despite all that, you were fairly confident in your analysis about the substantial elements et cetera. Have these uncertainties lessened?

Dr Griggs: They have but they are still very significant. Clouds are still the biggest uncertainty probably followed by aerosols. I can go into why if you wish. The uncertainties are still very significant but they are reducing all the time.

Dr West: The socio-economic aspect to this is that the climate models start from a time-series of greenhouse gas emissions. What we have far less ability to do is to predict how those will change over the coming years. The special report on emissions scenarios done by IPCC in 2001 presents a number of scenarios and for each one we can only say, “These are feasible.” We cannot ascribe a probability to any of those scenarios so we are left with this almost irreducible uncertainty: which course of greenhouse gas emissions will we follow in the next century? Human science, social science and economic science struggle to provide better predictions than to pick a number of possible scenarios.

Q286 Chairman: We are getting to a level of irreducible uncertainty, are we, or is the degree of uncertainty increasing?

Dr West: It is not increasing for that reason and I would hesitate to say that those social sciences cannot improve their prediction of the way society will change, which is critical for the amount of greenhouse gases we emit. The same set of scenarios does not include policy changes to account for climate change. They just take four separate directions in which we might develop and look at what the emissions would be under those circumstances. We cannot identify a most likely scenario. We cannot even say, “This is business as usual and these are with Kyoto/without Kyoto”.

Q287 Lord Lewis of Newnham: Are you not in a position of trying to predict what is going to be scientific development? For instance, if one were indeed to get fusion coming along, one imagines that this is going to make a tremendous difference to something like CO₂ emissions and things of this particular nature. How far are your models dealing with independent or dependent variables? One of the great difficulties to me is always that in physics you are in the ideal situation of having the possibility of looking at independent variables. The trouble with biology is that very rarely are you in that situation because if you change one thing you then change at least 10 other things within the system. What worries me about the whole concept of the modelling process is it depends upon the assumptions on which the model is based. If the model is based on assumptions which may be in some way or other suspect—I do not for one moment suggest that—it can lead you to completely erroneous deductions and conclusions. This is really the essence of the whole of the modelling concept if I understand it correctly. You can say, “Within those particular terms this is the answer you get” but as you have implied this does not necessarily mean this is the right answer.
Dr Griggs: That is correct, although I would question that we are in the latter of your two examples where there are feedbacks between lots of elements of the system. If you change one thing, you certainly change maybe not 10 things but a thousand other things. In terms of the assumptions on which the models are based, the assumptions are the laws of physics so it is the exchanges of heat, moisture and momentum between the different elements in the system. Those are theoretically very well understood. What is uncertain is our knowledge of how those processes are applied.

Lord Taverne: The Hadley model is always spoken of with immense reverence as the best model around. Are there other models which are equally highly regarded and are there any differences between the models in different places? Do they come out with conflicting answers in some respects?

Baroness Perry of Southwark: When you were talking about sociological futurism surely China is very different from the UK or America?

Q288 Chairman: Let us deal with the first question first.

Dr Griggs: Yes, there are other climate models in the world more or less sophisticated. There are perhaps six or seven other groups in the world that would aspire to do the kinds of things the Hadley Centre does in terms of modelling. The National Centre for Atmospheric Research in the US, Geophysical Fluid Dynamics Laboratory are monitored at Princeton, the Canadian Climate Modelling Centre, the Japanese Earth Simulator Centre, the French CNRS and the German Max Plank Institution are probably the leading ones. Most of them would acknowledge that the Hadley Centre is probably in the lead at the moment but that does not always stay constant. In terms of do they find the same or different things, some of the things they find are the same and some are different. Generally, oversimplifying, the larger the scale of the thing you are looking at, the more they agree. The finer the spatial detail, the more dependent it is on local weather patterns and effects, so the more the models tend to disagree which of course gives us a problem when we are looking at the scale of the UK. The scenarios that we are developing for 2008 will not just use the Hadley Centre models but will use the Hadley Centre models and then apply the results that the other leading modelling centres also have in terms of producing that probability I talked about earlier. If you are talking about global temperature, every model says there is going to be a rise in temperature over a fairly narrow band. If you are talking about the rainfall over London going to increase, some will say an increase; some will say a decrease.

Dr West: My understanding is that the problem is that these different futures do not take account of real decisions. You referred to fusion or not which again we cannot ascribe a probability to. The way these scenarios were constructed, they looked at different descriptors, so the level of governance, the level of interconnectiveness of world societies, the amount of sustainability. They do not take account of will China go down a coal fired power station route or a nuclear route. They are not rooted in real decisions. They are ways of describing that multidimensional space that the future will go towards. We cannot see where in that space it will end up. We can just describe some of the directions. It is a real problem that those human sciences are not as advanced as the natural sciences in being able to plot a central tendency.

Q289 Lord Howie of Troon: Could you not do something along these lines?

Dr West: I think so. We are in a cul-de-sac in a way in that we have started to make these assumptions very explicit and in many predictions you will find the same assumptions have been made but they are hidden. For example, the World Health Authority has confident predictions of population and you will have to dig very hard to find the assumptions on which they base their prediction. In predicting climate, we are completely open that there are these assumptions that we cannot do anything about. I believe we can close the gap and start to say, for example, population is one of the drivers of global greenhouse gas emissions and give a central figure. It may not be the right figure but it will be one where, in the same way that climate modellers are happy with setting a parameter at a level, the social science will say, “Yes, that is within the bounds of possibility. That is the most likely outcome.” I do not think social science is able to do that yet.

Q290 Lord Howie of Troon: There are a variety of uncertainties here. I assume, being very experienced scientists, you look at your results with maximum scepticism?

Dr Griggs: Of course. The models can do the “what if?”. What if the world switched to nuclear power? What would the climate implications be? What if China switched from coal or continued to develop coal powered stations? What would the climate implications be?

Dr Reynard: It does not stop with the global models when we are talking about water resources. We need to talk about how we take the output from these global models and translate it into something that is catchment specific. This is called downscaling in space and time. We need to create the scenarios to be able to run at that catchment level. There is a layer of uncertainty. There is also a layer of uncertainty
within our hydrological modelling, so we have to be explicit about how uncertain hydrological models are in terms of how we structure them, calibrate them and run them in the future.

Q291 Lord Broers: May I ask whether the models are essentially predicting linear behaviour or is there a logarithmic growth that could take place? Do you predict a run-away situation in these cases or is this scaled linearly? If we add fusion power and we put down carbon emission, would the whole thing regress back to where it was before?

Dr Griggs: It is not linear at all. The earth system has so many different feedbacks. They interact in different ways. If you reduce greenhouse gas emissions, the temperature will fall because it is the main driver but there are time lags in the system due to the absorption of carbon dioxide by the oceans and so on. It is not just a linear reaction. You can get what are known as tipping points in the system where a feedback becomes a run-away feedback. You reach a certain critical threshold and it becomes a run-away positive or negative feedback.

Q292 Lord Broers: What are the implications of climate change on water quality?

Dr Reynard: Can I start by going back to the implications on water resources? The climate scenarios that have been suggested obviously put pressure on water resources. The indications are that flows during the summer are going to be forced down. There is uncertainty surrounding that. It is important to understand the catchment we are looking at as well because catchments that are small and responsive—their geology and their soils mean that the water runs off very quickly—are very vulnerable to changes in the rainfall that have been described. For bigger catchments such as the Thames, which is a groundwater dominated catchment, they can absorb changes in rainfall more easily. Dry summers, for instance, might not be so critical to them because of the replenishment of groundwater resources mean, on average, wetter winters. The water resource issue is not as clear as the rainfall. Rainfall does not just equate to run-off in that sense, so the water resource issue does add a layer of complication, if you like. I wanted to make a point about how water resources relate to variability. The current situation that we are in with water resources, which is anticipating problems for next summer with water supply should the current winter not be wet, results from last winter being dry and the summer being, on average, fairly normal. We are fairly vulnerable to a scenario that is not like the climate change scenarios that have been predicted. However, if you look at 2003, we were fairly resilient to drought when we had a winter that was very wet but a summer that was extraordinarily hot and dry, which is like the climate change scenarios. We have to be very clear about what it is in the UK that makes us resilient or vulnerable to drought conditions and how they relate to possible future climate change. In terms of uncertainty on water resources, there are layers of uncertainty as we go through the hydrological modelling but what we are able to do is apply our models, running the models lots and lots of times to provide some sort of function as to how likely we think these changes may or may not be, given the assumptions of the uncertainty of emissions and global models. Some recent work we have suggests that for the Thames there is a 10 per cent chance of a 10 per cent reduction in flows by the 2020s and a 40 per cent chance of a 10 per cent reduction by the 2050s. As time moves on through the next century, it is becoming more likely that we will see a reduction. Overall, any reduction at all is 85 per cent likely in the Thames, so these scenarios are putting pressure on the Thames catchment. Moving on to water quality, we look at the impact of climate change on water quality in a number of ways. We can do it by theoretical review, analogue if you like, and look back to periods that were warm or cooler and see what the impact was on water quality. We can do it through field experiments or large scale modelling. The first two, looking at analogues and field experiments, seem to suggest that there are major implications for water quality under climate change. However, when we run the large catchment models, the counter is true. We find that water quality changes are fairly insignificant, especially when you try and factor in things such as land use change, agricultural policy change and so on. They become less important. What is critical is that we undertake more modelling studies because our conceptualisation of the processes in water quality modelling need to be developed and improved and we need to apply a lot more of the new, recent scenarios that are coming out of the Hadley Centre to these types of models. It is a mixed story on water quality.

Q293 Lord Whitty: This is probably for Chris West primarily. It relates to the use of water, in particular in relation to agriculture. If your prediction on wetter winters and drier summers is correct, what are the implications for agriculture’s demand? Will there need to be more irrigation and more water for cleansing, et cetera?

Dr West: We undertook a study with the water industry to look at changes in water demand under changing climate. Although the increases in demand from domestic and industrial users were small, just a few per cent, the increase in demand, should agriculture continue to try and do the things it does now in the same places, will be up to 30 per cent by the middle of this century. Most of that water goes on potatoes which require a huge amount of water to be
profitable. However, if the climate change is as we anticipate and farmers react by growing crops further north and further west than they did before, the areas where potatoes will be grown will be less vulnerable to drought. At the moment, East Anglia is the centre of potato production. It is also dependent on social decisions. This is not a social decision but decisions on the techniques used for irrigation. Spray irrigation is extremely wasteful. Trickle irrigation, use of mulches, things like that, can reduce water use considerably. Under conditions of no other changes, yes, climate change will increase the need for irrigation water.

**Lord Whitty:** In terms of the most profitable areas of agriculture, horticulture is probably the most profitable, is the most located in the south east and uses the most water. There are techniques for reducing the use of water but, where we can grow potatoes elsewhere, the economics of growing for horticulture have to be close to the market. It could be worse if no change in the kind of crops is a plus 30 per cent. A switch to greater horticulture as a proportion of agriculture will mean it is even higher.

**Dr West:** Yes. We need to invoke things like farm level water storage which is difficult in different parts of the country.

**Lord Whitty:** What about the parallel effect on the natural systems if you have change in the availability of water? How far does that change habitats, ecosystems and the things that English Nature are undertaking to protect?

**Dr West:** Can we put on one side for a moment rising sea level and just look at fresh water systems? A number of soil types and water body types are vulnerable to increased drying, particularly peat and bog based waters which are high in biodiversity. Some of the low nutrient upland streams also depend on low temperatures and low nutrients for maintaining their biodiversity. Those water bodies are vulnerable because clearly a water animal cannot shift from one river to another in the way that birds can and take up another habitat. We are doing work with the Environment Agency on this at the moment but we do not have results. There is clearly vulnerability there. On other habitats, terrestrial habitats, yes, there are indications that suitable bioclimate space will shift north and some animals will be able to move; some plants will not. Beech trees cannot uproot and move. There is an impact on the species mix that grows on a habitat, so there are those implications.

**Lord Lewis of Newnham:** Referring back to irrigation, I am reminded that in various parts of the States, where vast amounts of water were being used and there were historical rights to use water for irrigation in that part of the world, one of the things that happened was that people improved the irrigation systems and, in so doing, reduced quite significantly their water problems. You did touch in part on this. Is there much opportunity for such an operation to occur in this country?

**Dr West:** I suspect so. I am no expert. I would not care to describe it, but yes, you are right.

**Baroness Platt of Writtle:** You have mentioned one but how do your respective organisations work with major stakeholders in the water sector, notably Defra, the Environment Agency and water companies?

**Dr Griggs:** I will start at the climate end. We work extremely closely with Defra. They are our main funder. They are the government department which has the policy lead on climate change. Therefore, they fund us to provide the scientific basis on which to formulate their policy. We also work very closely with UKCIP, the Environment Agency and the Centre for Ecology and Hydrology. There is always more that we could do in terms of collaboration but generally relationships are close and very good.

**Baroness Platt of Writtle:** What about the water companies?

**Dr Griggs:** We have had some direct contact with water companies. For example, Thames Water. Our parent body is a parent body for the water industry as a whole. That is in terms of briefing them about climate change but the engagement of the stakeholders at that end is much more what Chris does in the UK Climate Impacts Programme.

**Dr West:** We have worked with individual water companies and other utilities, mostly in the context of our regional adaptation partnerships where we have at least the foundation of a partnership in every English region and the devolved administrations. We usually have a water company on those partnerships. We have also had talks with Thames Water and they are local to our office. We are starting to explore whether we can work together. Because we are publicly funded, we are reluctant to provide a direct benefit for one water company, so we are approaching them on the basis that we will help them so we can learn more about their adaptation process for us to disseminate to others. If they can work with us on that basis, we will go ahead. Like the Hadley Centre, we are funded through Defra’s global atmosphere. We also have an ongoing relationship with Defra Flood Management and Defra Water Resources. For both of those we have agreed that they do not need our help to coordinate their research programmes. Our role is much more about disseminating their research findings to other stakeholders with whom we are already in contact through our regional partnerships and other
partnerships. With the Environment Agency, we have used their regional structure. They have been instrumental in helping set up our regional partnerships and we have also worked with their Risk Forecasting Centre in Reading to produce a risk management framework which drives much of what we do. With the Agency, we said they do not need us to help them undertake their research programme. Our role is more dissemination, helping to link that research to other users.

Dr Reynard: We work with the stakeholders in a variety of ways. First, working with Defra, the Environment Agency and the water companies mainly through their coordinated research body, UK Water Industry Research Limited. We have direct commissioning. This is where we undertake science to directly support their policy development and their legislative requirements. We undertake customer work. Our other main source of funding is from our parent body, NERC, in the form of core funding which is principally for more fundamental science but always with an eye on underpinning the policy needs of our respective customers. Between those two there is an overlap. What we are moving into more and more is the idea of co-funding so we have some commissioned research from our customers and we also have core funding from NERC. The two work together to provide funding for key issues. An example of that is that the Flood Estimation Handbook was developed to provide the industry standard for flood estimation in the UK. It was principally funded by MAFF but supported to quite a large degree by core funds from NERC. We sit on a lot of steering groups and committees for things such as the DTI foresight initiative. We recently sat on a committee for that, providing expert hydrological advice. We are the official hydrological adviser for the government as well.

Q299 Chairman: Can I ask the CEH specifically on the question of monitoring of water? We were taking evidence last week from the Environment Agency and the chief executive, Baroness Young, said that in many ways they would like to do more monitoring but they were restricted sometimes to doing monitoring which was no longer relevant because of various regulations that are now perhaps dated. You must be doing a lot of monitoring to underpin your own research. Are you able to share resources with the Environment Agency or, for that matter, English Nature in monitoring water supply and water levels? Dr Reynard: We do. The amount of monitoring we do is limited. We have an experimental catchment where we take continuous data streams and various environmental variables. We have programmes such as LOCAR where we are monitoring and creating data archives. One of our main roles is hosting the National River Flow Archive at Wallingford where all the Environment Agency data on river flows are stored. In terms of additional monitoring, I would absolutely support, as the Environment Agency said, that monitoring needs to be targeted and needs to be increased for the areas we need to answer the questions that need answering, not just monitoring for the sake of it. We share all the data. Our archive is shared and is available to anyone.

Q300 Lord Lewis of Newnham: Is your monitoring involved with biological or chemical?

Dr Reynard: Most of our monitoring is to do with river flows and fluxes, so exchange of water from the land surface to the atmosphere.

Q301 Lord Lewis of Newnham: It is the volume of flow? Dr Reynard: Yes. It is water quantity, primarily. Dr Griggs: There is another aspect to the collaboration as well as monitoring, which is prediction. The UK is extremely well placed to develop new, innovative service in terms of prediction services. We three, along with the Environment Agency and Defra, are extremely well placed to do that. That is perhaps something that is not as well coordinated as the monitoring. With the potential for these new environmental prediction services for water and air quality, chemistry, pollution and so on—to take the results of that monitoring and feed them through models into real time predictions—we can predict the rainfall. As soon as it hits the ground Nick can take that and run it through catchment models, provide it back to us and we can provide it as a real time service. Those sorts of things we now have the potential to do. That perhaps is not as joined up as it ought to be.

Q302 Chairman: What would you suggest should happen to make it joined up?

Dr Griggs: The Environment Agency, who have a lead in this area, would have a very key role to play in bringing the various parts together. We have the operational capability and climate things to offer. Nick has the river catchment et cetera. offering. The Environment Agency have the monitoring. Defra have the funding. It is a case of bringing those things together to provide a coordinated, coherent, real time service.

Q303 Baroness Perry of Southwark: One government agency you have not mentioned is the ODPM. I wonder whether any of your organisations were consulted or whether you were used as experts individually in the plans to build the million new homes that have been suggested, particularly when they are being suggested in areas that are already pretty dry. Do you think those plans are sustainable?
Dr Griggs: I cannot answer that but we have not been consulted. We have provided extensive briefing to the planners of that development.

Q304 Baroness Perry of Southwark: When you say “the planners”, do you mean the ODPM planners or the local planners?
Dr Griggs: The local planners.
Dr Reynard: We have not been consulted but we have provided input. We have provided perhaps more input on the development side, whether it is in a place of flood risk or possibly increasing flood risk, rather than on the water resources side.

Q305 Lord Taverne: Did your input produce any reaction? Did anybody ask you questions and want to discuss?
Dr Reynard: Not that I am aware of.

Q306 Lord Lewis of Newnham: Did they ask the right questions? Did anybody ask you questions and want to discuss?
Dr Reynard: It is an area where we would like to do a lot more work. In terms of the water resources impact of this development, this is an area where the CEH would like to investigate more.

Q307 Baroness Perry of Southwark: Is it sustainable? Is it possible to have a million new homes in these areas?
Dr Reynard: I cannot answer whether or not that is sustainable but there are many domestic water demand management issues that need to be considered when thinking of developments such as recycling water and the use of grey water. I cannot comment on the sustainability of these developments in the south east but obviously where resources are already stretched new development is just going to add to the pressures. Novel ways of developing water use are needed.

Q308 Baroness Perry of Southwark: Can you lift the veil a little on the advice you gave to the planning authorities? Did you say to them, “This is a good idea. With a little care you can manage these extra million homes”?
Dr Reynard: I am not aware of exactly what we said in terms of the water resources. We have had some input in developing the policy guidance in terms of flood risk and climate change.
Dr West: We were not consulted by the ODPM but through the London climate change partnership and the east of England climate change partnership we have had an input into the process. We have provided those partnerships with tools to look at the risks. I mentioned having water companies on the partnerships in London. They were happily talking about new homes, new development for tourism. Somebody from a water company on the partnership said, “Just a minute. There is an impact here on water resources” so those partnerships are the way that we have contributed to that process. Yes, it is perfectly sustainable but the costs will be higher than otherwise. We may have to do some clever movement of water.

Q309 Lord Howie of Troon: I would like to ask Dr Reynard about the various directives, the Water Framework Directive, Habitats and the Priority Substances Directive. Do you think the hydrological processes are sufficiently well understood to allow these directives to be implemented?
Dr Reynard: This is an area of debate within hydrology. In general terms, the processes are fairly well understood for certain aspects such as flooding and groundwater recharge. They tend to be better understood in specific catchments where we have models developed and we understand what is going on. One of the key science developments in the future is to take those to a better understanding so that we can talk about national hydrological process understanding. That is a major challenge. When talking about these directives, we need to talk about the individual disciplines, biology and chemistry as well as hydrology and ecology. I guess the same is true for all of those. The real gap in terms of successfully implementing these directives is understanding the interaction between these disciplines. If we do not do that, we will not be able to establish the catchment management plans that are necessary for the implementation of these directives.

Q310 Lord Howie of Troon: We are back to uncertainties again, are we not?
Dr Reynard: We are.

Q311 Lord Howie of Troon: Do you think the directives themselves have taken sufficient account of these uncertainties?
Dr Reynard: There is a real need to start getting these disciplines together, to talk and model in an integrated way so that we can understand what the catchment response is and how we can determine good ecological status, for example, within a river and therefore develop a programme of measures. Until we join these disciplines together, there are potential problems with implementing these directives.

Q312 Lord Howie of Troon: Are the demands of the directives in advance of the state of knowledge?
Dr Reynard: At the moment, it is not the demands of the directives; it is the demands of the science to deliver the directives that is in advance.
**Q313 Lord Howie of Troon:** Is the directive asking you to do something that you are not quite ready to do?

*Dr Reynard:* Yes.

**Q314 Lord Lewis of Newnham:** What sort of timescale are you working to? I know the directives in principle are not there until 2021 but we cannot wait until 2021 to implement them in these particular ways and there have to be other pointers. I understand what you are saying, but there is an element of urgency here. Somebody has to coordinate the efforts here. As I read the paper that was given to us by Dr West, he emphasises the built environment and services have not been studied to any large extent and I think this is a very fair statement to make, but there are so many complications here. You have the situation over sewage. Do you talk about a primary, a secondary or a tertiary treatment? This varies in various areas and the needs will vary in various areas. It is the timescale and coordination. Who should be doing this?

*Dr Reynard:* I agree. It is becoming critical. The implementation is a long way away but we need to have the tools in place long before then so that we can achieve the ecological status when it is required. There are major challenges as to who organises this. I believe that to do this we need a major directed, targeted research programme.

**Q315 Chairman:** Your core funding comes from NERC, does it not?

*Dr Reynard:* It does.

**Q316 Chairman:** They are closing down the Lowland Catchment Research Thematic Programme. Is there something taking its place which would meet that gap?

*Dr Reynard:* Not at the moment. LOCAR was a fantastic programme but it looked at lowland permeable catchments as one type of catchment. What we need to do is really look at broadening that. We need a replacement for LOCAR but it needs to be broader than a NERC thematic programme. I believe it should be a cross research council funding programme and should include NERC, BBSRC, EPSRC and ESRC to include the socio-economics as well. That is quite critical to address some of the integrating of science issues. That has to be developed in discussion with the stakeholders who have to use these tools that will be developed from the programmes and implement the directives.

**Q317 Chairman:** I get the feeling what you are telling us that, in spite of the fairly distant date at which the directive is finally implemented, unless we move much faster than we are at the moment to get these multidisciplinary programmes, we are unlikely to have the science base to deliver the water catchment planning and management.

*Dr Reynard:* That is a risk, yes.

*Dr West:* We have experimented with a method of working with research councils. It has the potential to deliver useful results to decision makers faster than would otherwise happen. With the Engineering and Physical Sciences Research Council, we have undertaken a programme, *Building Knowledge for a Changing Climate*, looking at the built environment and the impacts of climate change, where we deliberately set out to make sure that every research project was co-led by a decision maker who needed the results and by an academic researcher. It means the decision makers are involved in that research process and can input to it while it is happening so that when the research is over they can apply the results straight away and the results are in a form that they can use. We would like to see that model followed with other research councils.

**Q318 Lord Whitty:** In your opinion, is enough research going into not just the impact on the various users, habitats, agriculture and so on but also the development of technologies to cope with that in those sectors and in the built environment etcetera? We are the Science and Technology Committee. Do you think there is enough focus on the new technology to deal with this, quite apart from the predictive impact?

*Dr West:* There is a need for more work on adaptation. We have done a good job in describing impacts, especially in the natural areas: biodiversity, agriculture, water. There are good research communities that have done a good job describing the impacts. The major gaps, to my mind, are the adaptation to those impacts, what people are going to do differently, how we find out how to do that. Also, the human and the built impacts where there is not a history of undertaking research in the same way that there is in the natural systems.

*Dr Griggs:* Where I slightly disagree with Chris is that the impacts research is in good shape. The UK is extremely well placed to advance climate impacts research. There are essentially three categories of impact research. There are global scale impacts which have major feedbacks on the climate system. If we deforest the Amazon and reforest the Sahara, those kinds of things have major impacts on the climate system worldwide. In order to look at those kinds of impacts, you have to do that in an integrated fashion within a climate model. Then there are impacts on a smaller scale, where one impact maybe does not have a significant feedback on the global climate system but it does have implications for other impacts. For example, traditionally, if we are looking at agriculture and we look at an impact model, we will take the results of the climate model and you will...
run what those impacts are for agriculture. If you are interested in water resources, you will take those climate impacts and look at water resources. Water resources affect the agriculture and the agriculture affects the water resources. We need to do a much better job of how we integrate those impacts. There is a third category, which I think is in good shape, which is where those impacts can be looked at in a stand alone fashion, impacts on health, for example, because health does not feed back on anything else so you can look at that in an offline way. In the first two of those aspects, an awful lot more research is required.

**Dr Reynard:** I agree with Dave but as a scientist I would always say that we need to do more research. On the water resources side, the work that we have been doing has provided the water industry and the Environment Agency with tools to take a fairly rapid, strategic look at what the impacts of climate change might be on their water resources and how they might plan for those, a tier one type risk assessment. It is really important that we enable the water companies to take the next step, to go to a tier two or three and become more quantitative when they are looking at making major management decisions about how to resource their particular zone. There are a lot of science issues that need to be included in that, including how to cope with the uncertainty that you are building in which, at the moment, is not within the very simple methodology for looking at the impact of climate change on water resources. There is a need for quite a lot more work in that area.

**Q319 Chairman:** Dr West, if there is this need for more work on the water resources programme, why does not the Building Knowledge for Climate Change programme have a water supply or water resources component?

**Dr West:** It deliberately avoided the water supply and also the flood issues because they were being addressed through other programmes. Professor Ashley was involved with the local drainage aspects of the built environment but the wider, hydrological aspects were not included.

**Q320 Chairman:** Leaving aside drainage, which luckily does not concern us, the water resources and water supply programme does seem to be an important component to put into the programme.

**Dr West:** I think it is. I did not mean to suggest that the impact research area was finished or running out of things to do. The adaptation agenda is an additional one.

**Dr Reynard:** It should be recognised that the water industry is probably one of the most engaged in the country in terms of taking on board the implications of climate change for its operations. That reflects the UK’s decision to not have water within that particular programme.

**Q321 Lord Lewis of Newnham:** How sensitive are you to directives when all of a sudden directives appear, as it were, which can mean quite a significant change? If you look at water abstraction, the Habitats Directive has changed very much the whole pattern of dealing with certain areas and this, of course, just appears. Are you involved in any way in offering advice as to whether any of these things should or should not be included in directives because directives are a matter of negotiation?

**Dr Reynard:** Indeed, and what these directives do is change the priorities in terms of how you allocate the resources available. The resource for domestic supplies is also for agriculture, the habitat and the environment, and it changes the priority for each of those. We are involved on the inside offering expert advice in terms of changes in the future, if you like, or how we model the current situation; what resources are available for that separation of resource, if you like, not so much in terms of the development of the directive itself.

**Q322 Lord Broers:** Where do you get your money for this research? Are the public funds sufficient to make up for what must have been a fall-off when the water industry was privatised?

**Dr Reynard:** On the water resources side we get funding from public bodies, such as Defra and the Environment Agency. We have had some funding direct from NERC in terms of our core funding, and climate change and water resources are two of our science programmes within a five year science strategy that we have within CEH. There is a lot of activity within the EU funding this type of science development. Despite privatisation the water industry is not a major funder, but it has been funding a number of projects in this area and in a way that I personally applaud in that they have been doing it jointly with the Environment Agency over the last few years. As a scientist that makes it a very nice way of working. There is a range of sources, but I would say that the level of funding is still quite low.

**Q323 Lord Broers:** Would you say it is well coordinated, not only within the UK but internationally and in Europe?

**Dr Reynard:** Within the UK it is fairly well coordinated. The fact that Defra and the Environment Agency obviously coordinate their efforts very well, the Agency and UKWIR as I say, have been working together on this so that the science that UKWIR commission the Agency are fully aware of and it can help steer as well. In that sense in the UK it is fairly well coordinated. I do not really know how well coordinated it is across Europe, other than to say...
that these large science integrated programmes, which are millions of euros, are working to look at the issues of drought, flooding and water resource availability in the future across Europe.

**Q324 Lord Broers:** They are not networked? The EC was quite keen on networks in a lot of other areas, I would have imagined they might have had a network that coordinated water research across Europe.

**Dr Reynard:** There are initiatives across Europe in terms of collecting data and analysing data in terms of river flows, low flows and water resources, such as the Friend Initiative. There are networks across Europe that coordinate the science.

**Lord Broers:** There is no international network that is tied to the whole global warming scene? Not everybody who is in Montreal networks with each other?

**Chairman:** This is the wider issue of climate change.

**Q325 Lord Broers:** Yes.

**Dr Griggs:** I think with climate change there is a good deal of coordination on science through the InterGovernmental Panel on Climate Change and, again, within Europe through the projects with the European Commission.

**Q326 Lord Broers:** It is not particularly directed towards water?

**Dr Griggs:** No.

**Q327 Lord Broers:** What about training? Are sufficient numbers of experts being trained to cope with this potential demand adapting to climate change and if not, where should the additional investment in training be focused?

**Dr West:** No. UKCIP, the Association of British Insurers, the Stern Review, the Working Group II of the InterGovernmental Panel on Climate Change, we are all looking for people who can work in the adaptation field. It is extremely difficult to appoint people. It is a very small pool, the same people go round and round. There is a need for more people who can jump from other fields into what is really a new collection of fields.

**Q328 Baroness Platt of Writtle:** Does any particular university run a course which suits you?

**Dr West:** At one level the MSc course at Oxford turns out some very useful smart young people.

**Q329 Baroness Platt of Writtle:** What is it called?

**Dr West:** It is adaptation to climate change and that rests on existing fields of risk management—

**Q330 Baroness Platt of Writtle:** Physics?

**Dr West:** No, not physics. Things like disaster preparedness, all of those fields might be useful.

**Q331 Lord Lewis of Newnham:** Is it a short course?

**Dr West:** No, it is not. I think there is a real problem because this is an area which brings in so many skills, you cannot go and say “The output for this course will suit”. Within UKCIP we have people from Canada, New Zealand, South Africa, and we have had a Romanian. There are not enough people in the country to satisfy the need.

**Lord Broers:** There is no international network that is tied to the whole global warming scene? Not everybody who is in Montreal networks with each other?

**Q332 Lord Taverne:** It is such a fashionable field at the moment, I would have thought people would be pouring into these related studies.

**Dr West:** Yes, I think rightly we are being quite picky. We need very good people to do this important job.

**Q333 Baroness Perry of Southwark:** As you say, the training is very much going to be bringing people in from these multidisciplinary fields and bringing them to work together, becoming an expert, so to speak, by working with each other. I wonder if, apart from ourselves at Oxford, there are any other centres that are beginning to develop this around the UK?

**Dr West:** Yes, there are. There are other MSc courses: University College London, University of East Anglia, to name but two. There are a lot of people coming through with some of the skills we need, not all of them.

**Chairman:** I think probably we are running out of time. At this time we will not delay evidence from the Drinking Water Inspectorate. Thank you very much indeed Dr Griggs, Dr Reynard and Dr West for coming to us today and for sharing your great expertise with us.

**Memorandum by the Drinking Water Inspectorate**

**INTRODUCTION**

1. The Drinking Water Inspectorate (DWI) was established in January 1990. It is responsible for the regulation of drinking water quality in England and Wales. It checks that public water suppliers supply wholesome water, and comply with the requirements of the Water Quality Regulations. Its functions include the audit and inspection of water companies and enforcement of regulations; investigation of consumers' complaints and incidents affecting drinking water quality; and provision of advice and undertaking research on drinking water quality problems.
2. DWI reports annually\(^1\) to the Secretary of State for the Environment, Food and Rural Affairs, and to the National Assembly for Wales. DWI operates as an independent Inspectorate, and decisions on enforcement and prosecution are made by the Chief Inspector.

**KEY COMPONENTS OF WATER SUPPLY MANAGEMENT**

3. We should like to draw the Committee’s attention to the drinking water supply management aspects of broader water management. These are characterised by two key components: the consistent delivery of a water supply to consumers that is sufficient in both quantity and quality. Our focus is on the quality of supply. Quality is defined by regulatory standards, developed and applied with the primary purpose of protecting public health.

4. We endorse the view of the World Health Organisation that “a preventative integrated management approach with collaboration from all relevant agencies is the preferred approach to ensuring drinking water quality”;\(^2\) and we strongly support the WHO’s initiative in promoting water safety plans as the most effective means of consistently ensuring the safety of a drinking water supply.

5. The primary objectives of a water safety plan in protecting human health and ensuring good water supply practice are the minimisation of contamination of source waters, the reduction or removal of contamination through appropriate treatment processes and the prevention of contamination in the distribution network and the domestic distribution system. These objectives are applicable to all water supply chains, irrespective of their size or complexity. Detailed guidance on water safety plans is provided by WHO in reference 2.

6. Management of the water supply/demand balance should take account of the consequences of insufficient, or restricted, supply. Application of the water safety plan approach from source to tap to sufficiency problems will facilitate the systematic assessment of hazards, risks, control measures and management requirements, and their implications for public health.

7. Predictions of the potential consequences of climate change were outlined by DEFRA\(^3\) using information from the UK Climate Impacts Programme (UKCIP). These include the significant potential impacts on water resources and quality of higher temperatures and more frequent periods of intense rainfall. Both impacts have direct consequences for drinking water quality and public health: challenging current paradigms for risk assessment; increasing the potential for contamination in catchments and the supply chain; and challenging the adequacy of treatment.

**CONSUMER EXPECTATIONS**

8. Drinking water supply management needs to meet not only regulatory requirements, and matters of good water supply hygiene, but also consumer expectations. Joint water industry research into consumers’ views on water and sewerage services in England and Wales conducted for the last periodic review of prices for the water industry provided a reminder of consumers’ expectations for the main product water management ultimately provides. Among the main findings were:

- **Importance of maintaining services**
  - “Maintaining the quality and safety of drinking water” and “ensuring a reliable and continuous water supply” were given the highest levels of support nationally.

- **Importance of improving services**
  - The top two areas for improvement, without any additional costs, were “improving the appearance, taste and smell of tap water” and “drinking water quality/safety of tap water”.

- **Appeal of individual elements of water company business plans**
  - The area of service delivery in the plans most supported by customers nationally was “ensuring the safety of tap water”. “Managing the appearance, taste and smell of tap water” and “ensuring reliable and continuous water supply” were the next most supported service elements.

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IN CONCLUSION

9.Achieving and maintaining drinking water quality objectives is a key requirement of sound water management, and tools such as drinking water safety plans are a useful means of delivering the clean safe tap water that consumers expect.

October 2005

Examination of Witness

Witness: MR MILO PURCELL, Deputy Chief Inspector, Drinking Water Inspectorate, examined.

Q334 Chairman: Mr Purcell, welcome. I apologise once more for having had to stand you down a fortnight ago. You were told that we were being distracted by divisions that day and were running out of time. Thank you very much for coming. Would you like to say anything about your regulatory authority before we start asking one or two questions of you?

Mr Purcell: Thank you. The Drinking Water Inspectorate was established in 1990. We are part of Defra Water Directorate for pay and rations. In practice we operate as an independent regulator and we have an independent profile. The reason we can achieve that is to some extent because we are unlike an ordinary line division, there are certain statutory powers vested in the Chief Inspector which make our situation a little bit different. We regulate the water undertakers in England and Wales, 24 of them and, basically, we check that the water supply is wholesome and complies with the regulations. We do that by audit inspection, investigation of incidents and events and we have the powers to enforce action if necessary. Decisions on enforcement and prosecution are vested in the Chief Inspector. That has been the recent updating of our role through the 2003 Water Act. We provide advice and guidance on drinking water quality matters and we undertake research on drinking water quality issues on behalf of the Department. We report annually to the Secretary of State. We produce a report for England and Wales. This report I have here is for England and we also produce regional reports which focus on local issues. We produce a similar report for Wales. In summary, our key thing is that we try to underpin public health protection; that is our main role. In doing so, we try to facilitate the delivery of clean, safe drinking water. Last but by no means least, we seek to maintain consumer confidence in public water supplies, which is often forgotten but quite an important aspect of what we do.

Q335 Lord Taverne: What evidence is there that totally eliminating priority substances from the water supply is of benefit to public health? My impression is that there has been no proper cost-benefit analysis. For example, there was a case about two years ago where the European Union tried to have a scientific basis for the minimum pesticide levels in water and Greenpeace ran a campaign, not to have scientific evidence but simply to have public opinion impose the levels, presuming on the grounds that they had a sense of osmosis that would reveal the right level as well. Is there effective cost-benefit analysis or are we over regulating and over precautious at great cost to the public?

Mr Purcell: It is a very important question and one at the heart of our role and not necessarily one I can give you an answer to in the sense that there is not a straightforward answer. I do not believe that on the drinking water side we have got a competent and useful cost-benefit analysis methodology, let us say that immediately. On the other hand, the concept of total elimination of priority substances is not one that I would ascribe to necessarily. I would suggest that what we are about is about managing risk of occurrence and managing the scale and the concentrations of that occurrence when it happens. Our standards are transposed from EU directives and they in turn, following challenge, are based on WHO guidelines. That WHO process is well established. It takes account of public health issues primarily and it takes account of the risk of occurrence and the consequence. As part of their process it is quite difficult for them to undertake a cost-benefit analysis of benefit in the way that we would like to see it applied here in the UK. There are differences though in approach in terms of the extent to which this might apply. For example, if you look at microbiological quality, we are looking at elimination insofar as we can do so, but we do it by monitoring indicator parameters. There are issues, but it is a constant and significant effort to deal with these issues. Parasites are a problem and cryptosporidium, which is in the news currently at this very moment, is an issue. The conduct of cost-benefit analysis and the application of current methodologies to those sorts of scenarios which have a direct and immediate impact on public health are quite difficult. Traditionally we have applied cost effectiveness techniques in the assessment of options for dealing with the issues.

Q336 Lord Taverne: Do they apply scientific standards or are they perhaps excessively sensitive to Green lobbyists who do not care about the scientific studies so much?
Mr Purcell: The WHO does apply scientific standards and it is a very rigorous process. Even in the more grey areas, if I can give you an example in tackling a chemical parameter, one of nitrate, which is again in the news at the moment currently, that is a standard of 50 and it has been for some time. It came through the process I described from WHO where it was originally put in place to deal with infantile methaemoglobinæmia, which is blue baby syndrome. The actual reality of the occurrence of blue baby syndrome in the UK is very, very low. On the other hand, this is a standard which has been challenged regularly. In preparation for the meeting I did a little bit of research and looked back on some of the commentaries that there have been and some of the bases for the MAC. It is interesting to look at the history of that one, for example, which is still current, where a 1993 report from the Parliamentary Office of Science and Technology on the nitrate standard indicated and noted that the Royal Commission on environmental pollution were not convinced that the standard was needed to safeguard health in the UK with satisfactory public water supplies. On the other hand, the committee itself concluded that few medical experts have argued that the level of 50 should be altered and they concluded that the standard was prudent and, “...it can only be questioned on the grounds of cost effectiveness”. That was a House of Lords Select Committee in 1989. The 1993 House assessment of managing drinking water risks concluded—and I paraphrase—that “the application of this standard was very cost ineffective”. On the other hand, it also noted that the view of the Royal Commission, as challenged by environmental and consumer groups and also by the British Medical Association, is that it feels that, “...the 50 standard is generally acceptable on health grounds and should not be raised”. The assessment of cost-benefit in that scenario is very, very difficult indeed.

Chairman: Lord Lewis, I think you had better declare an interest on this one.

Q337 Lord Lewis of Newnham: I chair the Royal Commission.

Mr Purcell: I hope I represented your views in the right way.

Q338 Lord Lewis of Newnham: I think one of the real problems we have, if you take your nitrate question, which is a very fair one, is, of course, that it is absolutely true that nitrate on its own does not appear to have this problem associated with it, it is the combination of nitrate with bacteria which was observed then. The basic argument that can be used is: all right, you have got one of the components and if that is removed, then there is no problem, you do not have to control the other one. The real difficulty is, of course, that if you take that to its logical conclusion, you must meet the necessity, but if you take lettuce in winter and you eat a reasonable amount of that, then you will be consuming more nitrate than you would be by the ordinary consumption of water which you have in your daily intake. There is so much nitrate present in so many other commodities that the amount in water is not minor, but certainly it does not take the same role, it would appear, as if you just take the nitrate on its own. One of the difficulties which one has here is that water was an easy one to control, that was the argument. The downside of it, however, is that if we now look at the nitrate vulnerable zones in this country as far as agriculture is concerned we are talking about three times the amount of water associated with the total water consumption in the country. You are talking about something like 600,000 hectares of land concerned with this, which is three times the amount of totally contaminated land in the country. You have got a whole stack of ongoing problems. The cost-benefit analysis, if you are going to do it in its true sense, is not only concerned with the water quality there, it is the totality of it because the European Union made a ruling that the water content was not drinking water, but it was all waters must be less than 50 milligrams per litre and there, indeed, is where the big problem comes.

Mr Purcell: I would agree with what you say and, particularly, I recognise the point of water as a source compared with vegetables as a source; that is often quoted. This has direct relevance to the Committee’s current investigation into water management because our experience of this is very recently in a periodic review, for example, to our surprise, and that of the EA, we had identified, by water companies, an increasing problem with rising nitrate trends, to the extent that for a drinking water quality programme of just over two billion pounds, just under about one-fifth of the costs are attributable to nitrate schemes. They make up something like a quarter of the total number of schemes that we had to put in place. That presents the Drinking Water Inspectorate with real challenges because it is not as easy as some suggest to simply do nothing. We do not believe that is an option. Consumers have an expectation that action is going to be taken. There is the issue of consumer confidence that standards will be met. On the other hand, people say that we should deal with the source, we could not agree more, but the reality is that the pollution is already in the source.

Given the nature of our aquifers and the hydrogeology, that pollution will be there for generations. We have to consider putting in place schemes to deal with that. Our starting point is to look for the most sustainable scheme and, if we can, to put in blending solutions. We have worked with
the EA to try to identify blending solutions, and that raises a lot of issues because it may challenge assumptions that are being made about the assessment of water abstractions. I believe that perhaps we need to go back to basics and assess what is in the greater social good in terms of priorities in the application of water abstraction limits. It may well be the case that in the context of sustainable environmental impact, it is better to allow continuing abstraction, or to even raise it, to facilitate blending rather than to put in a membrane filtration scheme which is more energy intensive and has waste streams that are fairly toxic. Those sorts of issues have occurred and we have also sought to accommodate more environmentally friendly solutions, such as the one at Westlinks, where we have given time for the company to see if it can make gains from land management. In that particular instance, the company is looking to see if it can buy land and see how quickly that has an impact on the water that it abstracts in terms of nitrate concentrations. Unfortunately, in most cases that is not a realistic option.

Q339 Chairman: You have referred to the reoccurring problems of cryptosporidium and we have discussed nitrates, are there other reoccurring problems which need to be addressed? Perhaps you can explain water safety plans and why you think these are the most effective way of ensuring the safety of the drinking water supply?

Mr Purcell: I think there are issues. We believe that we have mentioned some. We are concerned about deteriorating water quality and we are concerned about the impact of climate change, that it is going to lead to a deterioration of water quality. That has impact and it challenges the treatment that is in place and places that under greater strain of the risk of failure. We are convinced that the introduction by WHO, and its likely adoption by the EU water safety plan, is a very sound way of proceeding. That takes an overview of an integrated approach to water quality management. In Compstat it looks specifically at a number of issues, but it divides it up into catchment, treatment and distribution at the consumer end. On the catchment side, it does impact directly on the Water Framework Directive and we are seeking a role in that. Basically, it looks at a system assessment, operational monitoring and documentation management; those are the three key elements. Within that framework there is applied a recommended approach to manage risk and we are very keen that it should be the management of risk. For too long the water industry has had a reactive approach to drinking water quality. We have spent a lot of time recently seeking to leave behind us that reactive passive approach and to move forward to a much preventative proactive approach and a risk management approach.

Q340 Baroness Platt of Writtle: Apart from quantity deficiencies, what are the main quality implications of climate change upon potable water supplies in the future? Should any action be taken now to offset these?

Mr Purcell: Yes. I mentioned the deterioration of raw water quality, that is at the heart of the impact because, as indicated in the Directing the Flow document prepared by Defra, there is less dilution of pollutants and low flows and that increases the impact on treatment. It challenges the treatment that is in place and it changes the parameters on which a treatment is based. The increase of temperature and frequency may increase alga blooms and it may increase eutrophication. An increase in agricultural activity because of the climate change may increase run-off of pesticides and nitrates, again exacerbating the current problems. That leaching of nutrients in pesticides is causing problems. I mentioned the nitrate programme, we also have to make provisions this time around for additional pesticide treatment. Whatever one thinks about the standard of 0.1 µg/l consumers consistently tell us that they do not want pesticides in their water. As an industry, we have spent a considerable sum of money removing pesticides. With rainfall intensity, that is another impact, it increases run-off and increases pollution loads. This is a concern, particularly for cryptosporidium, because the increase in pollution lowered a lot of torpidity and challenges treatment again. We have done a lot of work on cryptosporidium recently and I think we are very keen that work is built on. We have been justified in focusing on cryptosporidium as the recent increased incidence of cryptosporidiosis in North Wales and down the south coast of Portsmouth signifies. It is a very real issue and it has a significant impact on the community when something like that happens and there is a loss of confidence in the drinking water supplies. What we are really looking for is that increased risk assessment and increased monitoring, those are the ways that we see we can manage that situation of increased risk from climate change.

Q341 Lord Lewis of Newnham: One of the big problems I have also envisaged here is if you look at the quantity of water that we use for drinking, in the average household that is between four and six litres per head per day, yet we consume via the system something nearer 150 to 200 litres per day. There is obviously a difference here between the use we make of water. One of the questions that we would like to put to you is what about using run-offs for things like toilet flushing, washing cars, which is presumably where some of this 150 litres that we are pouring off...
at the moment is being used? Do you see any dangers, particularly medical problems, associated with this type of usage?

Mr Purcell: In the circumstance that we are in and likely to move to, if one accepts the evidence of the climate change to date, then we need to consider all of the tools that are available to us. As part of a package of measures to manage supply and demand, then this is something which has to be considered. If it is used with discipline in appropriate circumstances, we would see no reason why it should not be an option. The greater benefit might be in the whole cost-effective situations where you have got an institution or a large user and they can get good use; it is more cost-effective in those situations. There are public health risks and that should be recognised, but that is where the discipline comes in, from the potential for cross-contamination with the potable water supply and from the potential for backspionage to the drinking water supply mains. That is a risk to be managed. Maybe some of the issues are more practical in terms of its introduction. It strikes me that some of the talk about the use of rainwater is commendable, but there is a question mark about its availability at the time when you need it, which generally makes the assumption that there is adequate storage, given that there is a coincidence of drought time and high usage. There is an issue of the use of grey water and its acceptability as an alternative. Who amongst us, by choice, would wash our car with grey water? Will it give us the result that we desire? There are acceptability issues, that is one relatively easy example. There are maintenance issues. The use of grey water is going to bring higher maintenance costs depending on the level of treatment of that grey water prior to use, of course. That level of treatment prior to use, since it is not potable water, brings with it a certain amount of sediment and discoloration, it brings with it the potential for sliming and the potential for it to cause problems as regards maintenance in, for example, ballcocks and other devices currently used. That maintenance requirement brings with it a cost. There are issues from the practical side as I see them, although I would accept that all of those can be managed.

Q342 Lord Whitty: We are aware of the possible vulnerability of the water supply to this localised sabotage, but in view of the heightened terrorist risks, how substantial do you think those risks are and is enough being done to assess those risks and what we can do about them?

Mr Purcell: There is a considerable amount being done about those matters and there has been for quite a long time. Efforts have been redoubled recently. Quite a lot of money has been spent to make more secure drinking water facilities, treatment and distribution facilities. The assessment is that there is a low risk of terrorist contamination of drinking water supplies but, again, it is a risk that one manages as best one can. The scale of water supply assets is such that there will always be a risk no matter how low, it is difficult to eliminate it completely.

Q343 Chairman: Can we go right back to your original statement about the function of the Drinking Water Inspectorate. It is your duty to enforce ultimately water quality regulations. What input do you have in updating these regulations? To what extent are they coming out of Brussels anyway?

Mr Purcell: We have a significant input in that because we are a line division, we provide the technical support to the Water Directorate. It is not unusual for some of our staff to provide that technical input both here in the UK and in meetings in Brussels. As such, it would be the norm for policy and technical people to attend these meetings. We are also seeking to influence our colleagues throughout Europe. We instigated the formation of a Europe-wide Water Quality Regulatory Forum and that is now the main forum for drinking water quality in the EU. The Commission sits in an informal capacity in that. That is currently looking at aspects of the revision of the current directive which has to be revised relatively soon. We make a point of ensuring that we have an input into the development of the ideas and that we contribute to the debates at that initial stage of the forming of ideas and directions. When it comes to the input at WHO level, we are again quite active because a lot of what we have comes from WHO and we contribute to WHO committees at various levels and seek to influence outcomes, with some success.

Q344 Chairman: Going back to Brussels rather than WHO, do you have adequate right of audience at the right committees or is Defra the lead department? I know you see yourselves as distinct from Defra, rightly, so there must be times when you would need to be there, but are you always there when you want to be?

Mr Purcell: Nearly or we have the means of inputting. We have no rights of audience. We do have a close relationship with Defra, and whilst our future is up for consultation at the moment, or will be quite soon, we would hope that close relationship will continue. Currently we are satisfied with the arrangements that are in place.

Q345 Lord Whitty: Is your future up for consultation because of the separation of policy and enforcement or because of the Hampton Report, or both?
Mr Purcell: It is a combination of the Hampton Report, which considers that “big is beautiful” in the sense that we are to be consolidated into a larger regulator, and the Better Regulation Initiative, which considers that “less is more” from the Cabinet Office. I am told that there is a coming together of those thought processes in the detail.

Chairman: There can only be one way of compromising on that and that is to leave things as they are.

Lord Broers: My Lord Chairman, I have a question that is not entirely frivolous. Do you think it would be better if we spent the vast sums of money presently spent on bottling water and carrying it around the country in carbon-producing vehicles or ensuring the quality of our running drinking water instead? Not that we could do much about the market, but it is something that troubles me.

Q346 Baroness Platt of Writtle: No teenager can move about without a plastic bottle of water.

Mr Purcell: The obvious answer is yes, not only from our perspective but in every interpretation of the meaning of sustainability, it would be better because it is cheaper to use tap water. On the other hand, we take the view that it is a matter of personal choice and culture and lifestyle. I will admit that I have used bottled water in the past when I have been out with my children and we need a drink. We are not setting our face against bottled water. We recognise the point of sustainability, but the reality is that we expect there to be competition in the market.

Q347 Lord Lewis of Newnham: Did you expect to be able to see jugged water or bottled water in the House of Lords?

Mr Purcell: I noted that there was bottled water and I was surprised.

Chairman: On that note, thank you very much for coming back again. I apologise once more that you were unable to give evidence when you were expecting to. We have found it most helpful. We will have to see whether the powers that be will recognise our interest in jugged water. Thank you very much.
Memorandum submitted by the Consumer Council for Water

INTRODUCTION
1. The Consumer Council for Water (CCWater) welcomes the opportunity to submit evidence on the consumer perspective on the issues within the remit of the Sub-committee.

CONSUMER COUNCIL FOR WATER
2. CCWater is a non-departmental public body representing water and sewerage consumers in England and Wales. It took over from WaterVoice on 1 October 2005. CCWater operates through nine committees in England and a committee in Wales. Its duties include representation of current and future consumers.

3. CCWater is independent of both the water industry and the regulator. Details of our planned activities and what we are seeking to achieve will be set out in our Programme 2005–08, to be published and consulted on at the end of November. This will set out how CCWater proposes to meet its duty to contribute to the achievement of sustainable development. CCWater intends to be active in educating customers on the wise use of water and in securing a sustainable water industry.

RIGHTS AND DUTIES OF CUSTOMERS AND CONSUMERS
4. Customers of appointed water companies and sewerage companies in England and Wales have statutory rights to require a connection and for the company to supply a service. In the case of water supply it is for domestic purposes and/or commercial activities. Similar obligations exist in the sewerage service. As far as domestic customers are concerned, there is a statutory entitlement for them to have a supply of water for domestic purposes. Domestic purposes extend to supplies for drinking, washing, cooking, central heating and sanitary purposes plus garden watering and car washing if these latter two activities can be carried out using water from a tap inside the house and without using a hosepipe. Water companies may charge for water for additional purposes such as hosepipes, sprinklers, swimming pools and ponds, and power showers and large baths1.

SUMMARY OF KEY ISSUES
5. Research undertaken during the 2004 price review indicated that customers attached great importance to “ensuring a reliable and continuous water supply”. It was also an area of service delivery where customers gave strong support to their companies’ proposals to undertake further work to secure present and future supplies of water2. Customers also have a right to expect that the prices charged for water and sewerage services are no higher than they need to be.

6. The inexorable rise in public demand for water, coupled with a projected housing boom and possible curtailment or revocation of abstraction licences, is placing water resources under strain. This is especially true in the south-east and east of England to the point where several companies are experiencing difficulty in making sufficient water available to fulfil their statutory duties.

7. To ensure that customers, now and in the future, have sufficient water CCWater believe that the following steps need to be considered as a matter of urgency.

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Demand led issues

— undertake a comprehensive review of available evidence on the impact of metering on demand management;
— consider compulsorily metering all properties in resource constrained areas where it is economic and practicable to do so. Such a policy should be preceded by a rigorous cost benefit analysis of all the available options;
— actively promote metering in areas where resources might come under strain if the current situation is allowed to continue;
— build water efficiency into the design of all new homes;
— focus promotion of water efficiency measures to existing housing stock at district meter level to assess effectiveness of campaigns; and
— work more closely with white goods manufacturers (and others) on developing appliances that are less water intensive, and on an accredited labelling scheme.

Production led issues

— Water companies to work more closely with planning authorities so that new homes are sited in areas where there are available water resources and supporting infrastructure;
— build new or extend existing reservoirs where demand management is unlikely to deliver savings that will meet projected shortfalls in supply;
— greater utilisation of water reuse needs to be considered; and
— flood risk management needs to be integrated into resource management and drainage strategies.

8. In the longer term companies will need to undertake a phased programme of installing advanced, smart, meters, but the cost of taking such a step precipitately would cause unacceptably large increases in customer bills.

9. CCWater’s written evidence follows the order of the specific questions raised by the Sub-Committee. It has been prepared by CCWater in consultation with the former WaterVoice Council and gives the consumer perspective of water management issues.

Q1: What are the causes of the current problems of water supply, and how serious are they?

10. The current problems with the availability of water resources are concentrated in the south-east and east of England, and have a multiplicity of causes. These are listed below.

Causes

Demand for water

11. Public demand for water is rising as shown in Figure 1. Rising public demand is putting the long-term sustainability of water resources and the availability of water for public supply in doubt.
20 December 2005

Figure 1: Per capita consumption (litres/head/day) 1994 to 2004; measured, unmeasured and average

Note: 1998 was a wet year and 2003 a dry year.

Source: Ofwat (various years) “Security of supply, leakage and the efficient use of water.”

12. Those companies reporting the highest per capita consumption are predominantly in the south of England, particularly the south-east. According to Ofwat\(^3\) average household consumption in 2003–04 stood at 154 litres/head/day (l/h/d). The average for several companies in south-east England is higher—Southern (162 l/h/d), Folkestone and Dover (167 l/h/d), Mid-Kent (173 l/h/d), South East (178 l/h/d), and Sutton and East Surrey (185 l/h/d). This contrasts with 129 l/h/d in Tendring Hundred, a company with the highest metering penetration rate in the country at 62 per cent. These figures exclude supply pipe leakage.

Rainfall trends

13. The current situation has been triggered by low rainfall. In the south east of England, rainfall between November 2004 and June 2005 was 62 per cent of the 1961 to 1990 average. If winter 2005–06 rainfall is again below the long term average then companies’ reservoirs and groundwater sources will not be recharged, with the consequent likelihood that the water use restrictions (sprinkler and hosepipe bans) imposed this summer will again be needed next summer.

Increasing levels of urbanisation

14. The effects of reduced rainfall are compounded by development on flood-plains as extensive areas of hard impermeable surfaces causes surface water to run-off into rivers, out to sea, or cause localised flooding, especially in high rainfall events. As a result water which had previously helped to recharge groundwater levels is being lost as a water source. In the south-east of England, around 70 per cent of water supplied comes from groundwater sources.

How serious are they?

15. The combination of these factors indicate that water management is a serious issue that needs to be addressed.

Demand for water

16. As households in the wider south-east tend to use more water than in other parts of the country (see paragraph 12), levels of demand must be managed if security of supply is to be maintained. Per capita demand has increased slightly over the past few years, but it is thought the increase will slow over the next few years as the uptake of water intensive appliances such as dishwashers may have peaked4. However, this forecast may be affected by unusually hot, dry summers which can lead to an increase in demand for lawn/garden watering. That said, demand for water is a variable that with careful management could be influenced to reduce (but not remove) pressure on the public water supply in water stretched areas.

17. For Folkestone and Dover Water, the problem is serious enough to prompt the company to apply to the Secretary of State for designation of its supply area as a water scarce area. If granted, this would enable them to take an additional measure over the next few years to help manage demand, the compulsory metering of up to 90 per cent of their customer base. CCWater has been invited by Defra to comment on Folkestone and Dover Water’s application for water scarcity status, by 28 October. We will send to the Sub-Committee a copy of our response to Defra.

Rainfall trends

18. Evidence from the Environment Agency suggests that the pattern of decreasing average rainfall year on year is set to continue into the foreseeable future. This will have a serious effect on the environment, on agriculture, and on the availability of water resources for public water supply in the south-east and east of England.

Increasing levels of urbanisation

19. Increasing levels of urbanisation will place more pressure on resources via increasing demand for water and the associated impact on ground water levels. Integrated planning at regional and local level, involving those with an interest in water resource management, drainage and sewerage provision, and flood risk management is crucial. Without it we will not be able to promote the availability of water for domestic and commercial consumption, and minimise the impact on the environment and on water users.

20. We have concerns that the proposed developments in the south-east and east of England are not sustainable in terms of the additional pressure that will be placed on both water supply and sewerage systems, and that this may also lead to increased flood risk. Unless there is a significant increase in targeted infrastructure investment then the existing network provision will be unable to cope with the demands placed upon it. This requires greater co-operation between water and sewerage companies and the planning authorities.

21. Water companies and sewerage companies are not statutory consultees to planning applications and rely on the good intentions of planning authorities to advise of developments. Smaller developments, such as infills, are not usually notified. It can often be incremental development that places strain on company networks, particularly the sewerage system. We consider that this approach is inadequate. Planning authorities should be required to consult with water companies and sewerage companies about planning applications. By the same token companies should be proactive in contacting planning authorities about current and future capacity of local systems so that this can be taken into account when deciding on small scale developments.

In our view

22. We believe it is important to understand the regional dimension of these water supply problems. Ofwat’s annual “Security of supply” report5 shows how each water company is performing against its “target headroom”. Target headroom is the difference between water available for use and the distribution input that companies need in each of their resource zones, to take account of future supply and demand uncertainties. Over the last three years, companies with deficits against their target headroom have been concentrated, but are not exclusively, in the south and south-east of England.

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4 ibid.
5 ibid.
20 December 2005

23. In contrast, other companies such as Northumbrian Water have “spare” water, while several others have not had a deficit against their target headroom in the last three years. We consider that measures to address water resource and supply problems must be proportionate to the severity of any problem in each area. What is appropriate in an area where water resources are stretched will not be cost effective in an area where there is plenty of water such as the north east of England.

24. Any measure involving capital expenditure designed to increase the supply of water available for use, whether it consists of metering, reducing leakage or generating a new resource, must be tested against all other measures that could achieve the same result.

Q2: What are the projections for future water supply, and what factors will influence these projections? Where, and over what timescales, may problems emerge?

25. Projections for future water supply are a factor of future population growth and distribution, consumer demand growth and the co-relation between these and the regional availability of water resources.

Water resources and climate change

26. The availability of water resources is subject to rainfall trends and the impact of climate change, which is a difficult variable to predict. The UK Climate Impacts Programme (UKCIP) forecasts that summer rainfall will decrease by 15 per cent in the south east by the 2020s. Other parts of England and Wales will also be affected to varying degrees, but water resources in those localities are not yet so stretched, and there are no plans for development elsewhere in England and Wales on the scale proposed for the wider south east of England.

27. Problems with the long-term sustainability of water resources and supplies have already emerged in the south-east. Based on the population and climatic forecasts above, we expect water resources to become more stretched in the next 25 years over an increasing area of the east and south-east of England. However any combination of drier summers and wetter winters will mean that greater headroom will be needed to maintain supplies in the extended summer peaks but more water should be available to replenish resources during the winters. This suggests that the construction of new, and enlargement of existing, reservoirs is the best option for securing long-term supplies.

Impact of population growth

28. Demand in south-east and eastern England will increase because of plans to build more than one million new homes by 2016 in Milton Keynes, the Cambridge-Stansted corridor, the Thames Gateway, and Ashford in Kent. Based on these figures, pressure on water resources and the public water supply will grow in south-east England, and become a significant issue in London and the east of England.

29. The effects of population growth will be exacerbated by the trend for smaller households, as per capita consumption has been found to increase with decreasing household size, and increasing longevity. In a single person household, per capita water consumption is 40 per cent greater than in a two-person household.

Metering

30. Since the early 1990s all new properties have been compulsorily metered. In addition, water companies will compulsorily meter those households with high discretionary use, eg swimming pools and spas. Water companies are increasingly taking the opportunity to meter households on change of occupancy. Finally, companies operate a meter option scheme whereby customers who consider that they may be better off financially transfer from an unmetered to the measured tariff. All household meter installations are free of charge at the point of delivery with the cost recouped over time from the companies’ customer base.

31. The number of metered household properties increased from 18 per cent in 1999 to 26 per cent in 2004. In the 2004 price settlement water companies have been funded to install 1.5 million selective and optional meters, increasing penetration nationally to almost 36 per cent by 2009. Meter penetration can, however, vary significantly by region, as shown in Figure 2.

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6 Sustainable Communities: Homes for All, ODPM, 2005.
32. Current metering policy is inherently inefficient as, with the exception of new developments, installation is piecemeal as companies react largely to notifications of change of occupation or to customers’ requests to install meters. This limits the development of smart metering thereby reducing the prospect of innovative tariffs. If companies introduce tariffs that vary according to the stress on supply and increase according to consumption above a certain threshold, then consumers will be able to adjust their water use on a rational basis. Such tariffs would need safeguards to protect vulnerable groups and those on low incomes. This should be considered within the current debate on water affordability.

**Water efficiency**

33. Water companies have a duty to promote the efficient use of water by all their customers. Ofwat monitor this by looking at how measured customers are given incentives to use water wisely and education programmes to raise customer awareness. Examples of water saving measures include cistern devices that can reduce water usage by one or two litres per flush, and attachments to taps and showers to limit water flow. Ofwat also assesses whether company activity to promote water efficiency is economic, whether it costs more to save water than to deliver additional water, and whether the promotion of water efficiency is directed to those customers who would benefit most.

34. The companies’ duty to promote water efficiency is a good starting point, but it is difficult to monitor the effectiveness of this as not all properties are metered. Only measured customers benefit financially from water saving. A key issue is how to provide incentives for unmeasured customers to save water.

35. The water industry has recently launched Waterwise to co-ordinate water efficiency projects. CCWater will explore with Waterwise how they can work collaboratively to reduce stress on the supply-demand balance in England and Wales.

Q3: *Is sufficient research being devoted to predicting, and handling, possible future scenarios?*

36. It is imperative that there is a robust evidence base to support any investment to implement any new water resource management measures. All parties should agree.

37. It is noteworthy that investigations are proceeding into the potential for raising Darwell and Bewl reservoirs which currently have capacities of 31,000 ML and 4,370 ML respectively. An investigation into the construction of a new reservoir at Broadoak is also underway. All three reservoirs are in south-east England.

Q4: *Is the response of Government, the EU, regulators and the industry adequate?*

38. We cover this question in our answer to Q5 below.
Q5: What are the options for increasing water supply, and what are the arguments for and against?

39. Options for increasing water supply should be considered as part of a holistic approach to water resource, supply and demand management. The water companies currently use a “twin-track” approach to water management focussing on demand management via metering, water efficiency measures and leakage control, and the development of sustainable water resources to enhance and maintain the availability of water for supply. A more holistic approach would require water companies to engage more with planning authorities to develop a more strategic approach to water resource management at regional and local level, and to place more emphasis on the relationship between drainage systems and water storage.

40. The options for increasing water supply either focus on increasing the availability of water for supply, or on managing demand for water. We set out below our views on a range of options.

**Increasing the Availability of Water for Supply**

*New reservoirs*

41. New reservoirs can be built, or existing ones modified to increase storage capacity, but have a long lead in time. They ultimately have a big impact on the availability of water for public use, although they can take decades to plan, develop and come online. They are also expensive—Thames Water plans for a new reservoir at Abingdon in Oxfordshire will cost in the region of £900 million—and to be effective there needs to be enough rainfall in the catchment or available sources for abstraction to ensure that they can be replenished in times of plenty. Reservoirs offer a long-term solution, but they need to be ‘future’ proof to anticipate future increases in demand and changes in the availability of water resources and the impact of climate change.

*Extending reservoirs*

42. As well as building new reservoirs, the capacity of some existing reservoirs can be extended to allow more storage of water. For example the capacity of Abberton Reservoir in Essex and Suffolk water supply area is being enlarged by 60 per cent by raising the top water level by 3.2 metres. This is both cheaper than building a new reservoir, and does not take up large areas of new land. Nevertheless, additional infrastructure will be required to transport water from new abstraction points to the reservoir.

43. In south-east England there are three existing reservoirs, two of which have trunk mains linking them, which are candidates for this vertical enlargement, Bewl Water, which has a present capacity of 31,000 Ml, Darwell Reservoir (4,730 Ml) and Powdermill (1,060 Ml). If each of these were to be raised by 3.2 metres, and the capacity were doubled, using Abberton as an example, these three reservoirs would add nearly another 37,000 Ml to the south-east’s stock of water. That would amount to 30 days of distribution input of water made by the four water companies who would benefit—Southern Water, Folkestone and Dover Water, Mid Kent Water and South East Water.

*Desalination*

44. Desalination is another option. Thames Water proposed a £200 million desalination plant on the Thames Estuary at Beckton, East London, which would provide up to 150 megalitres of water a day—enough for 900,000 people—at times of peak demand. This was ruled out by the Mayor of London on the basis that it was too energy-intensive and conflicted with both the Government and Greater London Assembly policies on reducing carbon emissions. We agree that it is undesirable to choose options that depend on substantial use of carbon fuels (they are also a very expensive option) but provided the use of desalination plants is restricted to supplementing supplies at peak times, we see no objection to their deployment.

45. We agree with the principle that before investing in expensive technologies, other more basic approaches to water resource and demand management should be considered and ruled out. For example, where energy intensive technology is required for water treatment, companies should look to supplement use of conventional energy with alternative sources such as wind power, photo-voltaic panels, or even hydro power. We have seen some possible examples of the latter in a wastewater transfer scheme, where wastewater has to be transported over the South Downs for treatment and then back again over the same route for disposal. It is feasible to install a hydro-electric scheme within the pipe on the downhill side and use the electricity generated to help with pumping on the uphill side.
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Increased abstraction

46. Where water resources are available there is potential for companies to apply to the Environment Agency for increases to their abstraction consents. However, this is likely to be limited to regions where water resources are not under the kind of pressure currently being experienced in the south-east, and where there is no adverse impact on the environment (see also paragraphs 66 to 70).

47. There are some known possibilities, and these should be explored. The Environment Agency has a statutory duty “to take all such action as it may from time to time consider . . . to be necessary or expedient for the purpose . . . of conserving, redistributing or otherwise augmenting water resources in England and Wales.” We urge that this duty is pursued proactively.

Bulk supply agreements

48. Bulk supply agreements between companies can be used effectively to help offset the environmental impact of increased abstraction and to redistribute stocks of water. For example, Thames Water provide a bulk supply to Essex and Suffolk Water to supplement existing but limited supplies in the latter’s Essex supply area.

49. There should, however, be more cohesive regional management of supplies between companies with bulk supply arrangements. For example, if a company with water restrictions in place provides a bulk supply of water to a neighbour with no restrictions, there could be some arrangement in place whereby the receiving company seeks to reduce its bulk supply requirement to ease pressure on resources at a regional level.

Water transfers

50. With the existence of more than 20 water companies across England and Wales, the structure of the water supply network is fragmented. Although many companies operate bulk supply agreements with neighbouring companies, there is little scope to transfer water on a regional basis as ring mains through more than one company area do not exist. We think there is a strong case to look at integrating of supplies across company borders in water stretched areas such as the south-east to help address water distribution problems. For example, had the proposed acquisition of Southern Water by Vivendi Water UK Plc been approved by the Secretary of State, the completion of a ring main around the periphery of Kent would have been an option for the newly formed company.

51. Although part of the infrastructure is already in place—it requires collaboration of companies at a strategic level to complete the ring-main. This would be greatly enhanced if Darwell and Bewl Reservoirs were raised. If that happened, more water would be available at all times throughout the region, and security of supply would be greatly improved as well. As water is plentiful in the north, there is perhaps a case for looking, in the longer term, for ways of moving water across England and Wales. However, this strategy suffers from the environmental disadvantages of using huge amounts of energy.

Water rights trading

52. Another option is to ensure that all abstraction licences granted by the EA are being used to their full extent. We welcome the development of the “Water Rights Trading” area of the EA website which outlines the process and procedure to trade water rights where rights granted by an abstraction licence are no longer required. We are aware that unused abstraction licences are being taken up. For example, Folkestone and Dover Water has purchased abstraction licences formerly used by industrial users. We support this approach as it gives greater flexibility in areas where water resources are stretched. We expect that everyone with an abstraction licence should be made aware of the water rights trading scheme and the scope for contributing to the achievement of sustainable development through selling under-used water abstraction rights.
**Water re-use**

53. There are other potential sources of water that are currently being lost from the supply system, but which should be re-evaluated as demand for finite water resources increases. Water reuse may have a greater part to play in securing supplies than has hitherto been the case.

54. Unplanned indirect reuse of water has occurred in the UK for decades as water has been abstracted downstream of sewage effluent outfalls. Indeed, in drought conditions, many rivers in the south east of England would run dry without the contribution of sewage effluent.

55. However, there is one award-winning scheme where water is being deliberately recycled as a resource. Since 2003 Essex and Suffolk Water have been recycling treated effluent from Anglian Water’s Chelmsford sewage treatment works, previously all discharged to sea by means of a 15km pipeline. In times of low rainfall between 20 and 30Ml/d of treated effluent is pumped to Essex and Suffolk Water’s recycling treatment plant where the effluent undergoes UV disinfection and where phosphates, nitrates and ammonia are removed. This water is then discharged into the River Chelmer for later abstraction and pumping to Langford Water Treatment Works. Here it undergoes further treatment to ensure that the by now potable water conforms to all drinking water quality standards.

56. At present water falling on roofs, paved areas and highways is collected by surface water or combined (foul and surface water) sewers, and then transported to a sewage treatment works where it is treated before being discharged to a local watercourse or to the sea. There is, however, the possibility that such water could be channelled to local water treatment works either directly or, more probably, via sustainable urban drainage systems. Or that this water could be utilised by industrial customers, local authorities (for watering parklands) and sports venues where the need for a potable supply might not be necessary. This water gathering system could initially apply to new developments, but in time could be extended to those properties where rainfall is collected by surface water sewers. We do not deny that there are practical difficulties to be overcome but we believe that research into its feasibility and cost should be undertaken.

**Compulsory metering**

57. Folkestone and Dover Water, if granted water scarcity status, may seek by 2015 to meter compulsorily 17,375 households in order to reduce demand by 2Ml/d. This is equivalent to 25 per cent of its projected household metering penetration of 90 per cent. Its existing metering penetration is 45 per cent. Compulsory metering will cost the company around £4 million which will inevitably impact on customer bills.

**In our view**

58. In areas where water resources are at a premium, water supply strategy must be examined at a regional level and companies must work together. We appreciate that the interaction with the environment and the practicalities and costs of treating water and pumping it around are complex matters. But at some point water resources will become so stretched that it will become necessary and viable to consider practices such as more widespread water re-use. Much of this can be avoided if further investment in reservoirs is made in a timely manner.

**MANAGING EXISTING SUPPLIES**

**Leakage**

59. Although leakage from the supply network is not the principal cause of the current supply problems it becomes an issue once the availability of raw water resources is under pressure. According to Ofwat in 2003–04 total leakage from the network was almost 3,650 Ml/d of which losses from the companies’ distribution system accounted for 2,625 Ml/d (72 per cent). If less water is lost from the network, companies will need to abstract less water from the environment. Public perception is also an important factor. Companies perceived to be wasting vast amounts of water from leaking pipes are less likely to have the co-operation and goodwill of the public if they then ask them to save water.

60. Ofwat monitors the level of leakage from the network and sets individual water company targets based on the economic level of leakage (ELL) which take into consideration economic, social and environmental costs. This is the level of leakage at which it would cost the company (and customers who ultimately pay the bill) more to make further reductions in leakage than to produce the water from another source. However, of
the companies in the east and south-east of England only Thames Water (2003–04 and 2004–05) and Three Valleys Water (2003–04) have not met recent leakage targets. We question whether this has been a driving factor behind current water supply problems in the wider south-east. Whilst leakage is undesirable, if companies meet ELL targets then consideration must be given to how to justify further reduction of leakage. There may, however, be a need to review the basis for leakage targets in water scarce areas, and to manage public expectations about leakage levels.

**Metering**

61. There is some evidence that installing household water meters results in customers reducing their consumption. The NERA Supplementary Information appendix to the UKWIR Framework Methodology for Estimating the Impact of Household Metering on Consumption (the UKWIR Report), finds that “the initial effect of metering on consumption is approximately 9 per cent on average but varies from 2 per cent to 14 per cent depending on the volumetric charge”. The UKWIR Report was based on a number of empirical observations over a limited period of time. However, there appears to be little research on the long term effects on consumption levels, and the various estimates of water saved cover a wide range of peak and average demand levels.

62. Anecdotal evidence informs us that while customers may reduce their water consumption initially, in the longer term they tend to revert to previous patterns of usage. This is especially true of those who opt to have a meter installed. As they have calculated that their water and sewerage bill will be less on the measured than on the unmeasured tariff their response is to a clear price signal not to exhortations to save water.

63. Given the uncertainty surrounding the impact that metering has on reducing demand, we consider there is a need for a comprehensive review of available evidence to identify which studies present the most robust data and the best medium-long term estimates of potential savings. This review should also consider how different tariffs could influence customer choice.

64. Even where meter installation is likely to result in some level of reduced demand, there is still the need for a rigorous cost-benefit assessment to identify when universal metering can be considered as the best way to reduce demand in water constrained parts of England and Wales. Where the level of reduction is likely to be critical to the cost-effectiveness of a programme, we need to be certain that savings shown in trials are transferable to other regions where environmental and socio-economic conditions are different.

65. Metering can also help to reduce water wasted through leaks as supply-pipe leakage is identified if it leads to a high reading on the customer’s water meter. Companies offer a free supply pipe repair and will make an adjustment to the customer’s bill for water lost through leakage. It is unclear to us, however, what impact future metering programmes might have on supply pipe leakage. In areas where meter penetration is already high the biggest reductions in supply pipe leakage may have been made already. Occupiers of larger properties with high rateable values (and possibly larger lengths of leaking supply pipe) are more likely to have already switched to a meter to reduce bills. Smaller properties with lower rateable values, shorter lengths of supply pipe and lower leakage levels are less likely to be metered. These are the properties that might be picked up in a later metering programme.

**Water Efficiency**

66. More work is required to assess and measure the effectiveness of water efficiency campaigns. One way of doing this would be for companies to focus water efficiency campaigns at district meter level and assess effectiveness via monitoring of water into supply via district meter.

**Threats to Resource Availability**

**Reduced abstractions**

67. Many companies have expressed deep concern that their overriding duty to supply water to customers is being compromised by the environmental regulators’ desire to reduce or terminate companies’ abstraction licences where there is an actual or potential impact on the ecology of a local watercourse. Several companies have suggested that they will need to extend existing or build new reservoirs to meet projected shortfalls. We have serious concerns about abstraction reductions in the south-east where groundwater accounts for 70 per
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cent of distribution inputs and security of supply is already threatened by population growth and climate change.

68. We accept that there needs to be a balance between consumers’ needs for water and ensuring that wildlife is not adversely affected by over-abstraction. We are, however, perturbed that, in some instances, the environmental regulators’ interpretation of the Habitats Directive (92/43/EEC) can lead to unsustainable solutions to problems. These are often based on the assumption that if a particular abstraction cannot be shown not to be adversely affecting a habitat, it is deemed to be doing so and the abstraction must be curtailed.

69. The only company in the south-east which has a real surplus of supply over demand, Portsmouth Water Services, derives 60 per cent of its supplies from spring, borehole and other groundwater sources at Havant Springs and elsewhere, which impact on habitats which are subject to these presumptions. Water not abstracted from these sources debouches into Langstone and Chichester Harbours and also nourishes a habitat in the Fishbourne area. The EA, after investigation, was “unable to conclude that the Company’s abstractions did not adversely impact the habitats and/or species”. The company therefore faces a real risk that its most vital supply sources will be curtailed, quite possibly turning the company’s existing surplus into a deficit, this despite the fact the abstractions in question have continued without any noticeable ill effect on any habitats for many years (up to 160 years in some cases). Similar reductions based on the same “double-negative” assumption of damage are likely to have a similar detrimental effect on many other groundwater sources in the south-east, at the very time when the water which the sources contain is most badly needed for human consumption.

70. In its second consultation on water abstraction charging the Environment Agency has identified that it would cost £376 million in compensation to revoke authorised abstractions that have or could have an impact on Habitats Directive sites. In addition a further £32 million in compensation would be payable to curtail abstractions affecting Sites of Special Scientific Interest (SSSI) and over £40 million on protecting the ecology of other environmentally sensitive sites.

71. Using the Agency’s own estimates it could cost £1.5 million to provide one megalitre of water per day (ML/d) from an alternative source. Overall, the water industry and other abstractors could be looking for almost 300 ML/d. To place this figure in context this represents more than the average daily distribution input of Bristol Water (294 ML/d). More pertinently, the Agency has identified the need for water companies in the east and south east of England to reduce their abstractions by 172 ML/d by 2010 to meet Habitats Directive commitments. Companies in these two regions have a combined daily distribution input of 3,156 ML/d so look set to lose over 5 per cent of their deployable output over the next five years at a time when household growth is placing ever greater strain on resources.

In our view

72. Neither demand management (metering, water efficiency) nor leakage control is likely to be able to make up the shortfall occasioned by reduced abstractions and household growth. Resource development is likely to be needed sooner rather than later, but our experience of the Agency’s approach to twin-track resource management is to see if demand management delivers results before proceeding to resource development. Consumers require a more balanced approach than that.

Q6: What are the likely future trends in water demand, and what can be done to manage demand more effectively, and to influence the behaviour of consumers and others?

73. Wherever population is forecast to increase, the future trend will be for demand for water to increase. Whilst the north-east of England is projected to see a 2 per cent decline in population by 2028, regions in the south and east of England are forecast to see growth between 14 and 16 per cent.

74. In resource constrained areas, water companies can help to manage increasing demand by installing more meters and carefully controlling existing supplies as outlined in response to question 5 above. But to influence consumers’ behaviour in the use of water in the home and the workplace it is necessary to gain greater understanding of current practice. Incentives to save water can be built into the pricing structure and education in the use of water can assist. However we need to respect the basic entitlement of consumers to adequate supplies for all their legitimate requirements.

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Smart meters

75. Smart meters could be used to raise householder awareness about water use and encourage water efficiency. Currently, household consumers with water meters have little or no idea how much water they are using, or how much it is costing them until they receive a quarterly or half-yearly invoice. Household water meters are not readily visible to consumers as they are often outside the house or under the sink. One way to raise awareness would be to install smart meters with a display panel visible inside the house showing how much water is being used and how much it costs. It could lead to monthly bills and real time messaging about unexpected high consumption due to a leak on the supply pipe.

76. The barrier to smart metering at the moment is cost. Ofwat in its 2004 price settlement provided funding for companies to install 1.25 million meters. But this funding will only allow companies to install the older electro-magnetic meters rather than the newer, and smarter, digital meters. This could be viewed as a short sighted approach but the high cost of installing smart meters nationwide is likely to mean that it will not be cost effective for the foreseeable future.

77. However, there could be scope for a gradual programme of replacing the existing electro-magnetic meters with smart meters as the former reach the end of their useful life. For areas where there is high penetration of smart meters, rising block tariffs allow for consumption over a certain threshold to attract a higher tariff sending a clear pricing signal to consumers. UKWIR found that many metered households experienced a reduction in consumption which could not be explained, and which it attributed to a “frugality effect”. This would seem to be a likely sequel to the installation of a smart meter. However, the costs of the administration of the tariff and the potential incidence effects on large families make this problematic.

78. More information is needed as to how much water smart meters might save over conventional meters, and how much they would cost taking into consideration savings made as companies no longer need to physically check these meters or deal with customer contact about estimated bills.

In our view

79. We believe there is scope for CCWater to play an active role addressing water management and water efficiency issues to meet its duty contribute to the achievement of sustainable development, providing its duty to ensure that customers receive sufficient supplies to meet all their reasonable needs are met. Education will play a part. Also with a deeper penetration of traditional metering will come the ability for companies to apply seasonal tariffs, which are a partial proxy for sophisticated rising block tariffs.

Q7: What contribution can science, engineering and technology make towards reducing water use or waste by households, businesses and the public sector?

80. Consumers can change their behaviour and reduce water use and minimise waste, and they and all businesses and public sector organisations should be encouraged to do so. CCWater will wish to provide examples that consumers can relate to in the home and the workplace.

81. We welcome the development of affordable high-tech solutions towards reducing water use or waste by households, businesses and the public sector which have a cost-benefit advantage over existing approaches. But we caution against over-emphasis on ambitious and expensive technology projects. The use of “save-a-flush” and other cistern displacement devices shows that there does not necessarily need to be a high-tech approach to reducing domestic water use.

82. For businesses and public sector, we need to find ways of retrofitting water efficient equipment at lowest cost and with least disruption to day to day business. Environwise, the Government sponsored body that focuses on the business and public sector, reports a number of successes in helping businesses to introduce water efficiency measures to reduce consumption.

New build properties

83. We welcome plans for Part G of the Building Regulations to be revised to include water efficiency requirements for new buildings. The Environment Agency has estimated that installing efficient, rather than standard, water fittings, in new houses could reduce per capita consumption by about 20 per cent without placing significant additional costs on developers. This will help to offset some of the additional demand for water that will be experienced in the south-east as new homes are built. It is, however, unfortunate that of the
480,000 properties to be built in the east of England over the next 25 years most of those already built have not had water efficiency measures installed as standard.

84. However, there needs to be a greater focus on existing housing and finding low-cost ways of upgrading to water efficient fittings so that water is saved even with no behavioural changes in the use of water.

Water efficient appliances

85. Appliances designed to be water efficient are already available on the market and should become standard so that when kitchens or bathrooms are replaced, fittings and appliances will use less water. To appeal to consumers, there should be a clear accredited labelling system. For example, water efficient models could show a “lifetime” water saving versus comparable models not designed with water efficiency in mind.

86. Water efficient homes and appliances are a far more effective way of saving water than admonitions to save water and they run no risk of compromising the basic human rights of consumers or leading to adverse social or public health consequences.

Q8: What is the current state of the water supply and drainage infrastructure? Is there sufficient investment in its improvement?

87. Ofwat say that the current state of the water supply and drainage infrastructure is “stable”. We do not entirely concur with this view. We believe that price reviews prior to 2004 provided insufficient funds to allow companies effectively to maintain their networks. We also suspect that some companies attempted to make further cuts in their maintenance programmes and to pass these off as efficiency savings. Reactive rather than active maintenance increases the likelihood of problems on the network.

88. Analysis of Ofwat’s DG3 indicator10 and mains renewal rates suggests that there is an inverse correlation between an increase in prolonged unplanned supply interruptions and reductions in mains replacement and relining activity. In general, the greater the renewal rate in any one year, the lower the incidence of prolonged supply interruptions, and vice versa. This is shown in Figure 3.

Figure 3: DG3 - correlation between unplanned supply interruptions of 12 hours or more and mains renewals rates

[Graph showing correlation between supply interruptions and mains renewals]

Source: Ofwat (various years), “Levels of Service for the Water Industry in England and Wales”; and “Financial Performance and Expenditure of the Water Companies in England and Wales”.

89. After several years of improvement, the last five years, with the exception of 2002, have seen water company performance against the DG3 indicator steadily deteriorate, even allowing for exceptional events. This recent trend in deteriorating performance is beginning to undermine the good work that the industry has undertaken since privatisation in minimising the number and duration of supply interruptions.

10 DG3 measures the number of properties experiencing an unplanned supply interruption of greater than 12 hours.
The deterioration may, in part, be an unintended consequence of the design of the DG3 indicator. Most companies report a “good” assessment each year because they have the comfort of knowing that only significant incidents are likely to remove them from the “good” to the “acceptable” assessment. Likewise, only very large incidents move companies into the “needs improvement” band that stimulates regulatory action. As a result, this comfort zone can allow companies to defer programmes and remain reasonably secure.

In light of this problem, CCWater’s predecessor WaterVoice welcomed Ofwat’s adoption of the “common framework”, a four-stage approach to identifying the scale and scope of asset maintenance over the longer term. As a result Ofwat has provided companies with funding over the next five years that should see them make inroads into the backlog of asset maintenance. And there is every prospect that this enhanced funding will continue for the foreseeable future.

Q9: The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at national and European levels, adequate?

We think it is too soon to tell whether the legislation contained in the Water Act 2003 aimed at promoting sustainability and water conservation is adequate. For example, the Consumer Council for Water, which has a duty to contribute to the achievement of sustainable development, did not come into existence until 1 October 2005 and must be allowed time in which to demonstrate what it can deliver.

Sustainability implies not only that today’s development will not compromise the lives of those who follow, but also that adequate supplies of water for human and commercial consumption will remain available in spite of the development which seems set to occur. It also implies that the cost of implementing EU Directives will not have adverse social or economic consequences. The Water Act contains adequate requirements on water companies to provide for supplies. Ofwat to ensure that this provision costs no more than it has to, and the EA to meet its statutory duty to augment water resources. But we have to hope that the fulfillment of the latter duty is pursued with the vigour which the circumstances require. EU Directives suffer potentially fatal flaws, in that hardly any reference is made to the need for a cost-benefit analysis for schemes of improvement, except in the Water Framework Directive and then only to the extent of postponing or omitting schemes if the cost is “disproportionate”. These flaws mean that sustainability cannot be guaranteed, which is particularly unfortunate, given that Article 174 of the EU Treaty requires the Community to take costs and benefits into account when considering environmental schemes.

Q10: How does water figure in the development of Government policy in areas such as housing, land use planning and industry?

The Government’s approach to water management in the east and south east of England needs to be clarified. On the one hand ODPM has announced plans to build 90,000 of the 200,000 houses in the Thames Gateway on flood plains. On the other hand DEFRA is leading a cross-governmental group in developing a strategy for flood and coastal erosion risk management. We do not view as sensible plans to build housing in areas that, because of extreme weather events caused by climate change, will become increasingly susceptible to groundwater, pluvial and fluvial flooding, and to inundation from the sea.

We acknowledge that property overlooking lakes, rivers, streams, canals and the sea is much sought after. But property owners run the risk of increased flooding and are probably unprepared for the worst that natural forces can unleash. We therefore believe that flood risk management needs to be integrated into water resource and drainage management planning. There is an opportunity for developers to locally collect rainwater for reuse through, in some cases, storage in ponds (see also paragraph 55) instead of channelling it to sewer. This could bring environmental benefits (wildlife and amenity value) and reduce the risk of flooding, either pluvial or discharges from foul sewers. The Government’s “Making Space for Water” initiative has not given much consideration to this issue. It should do so now.

Q11: What can the UK learn from the experience of other countries?

We can review the available evidence to identify best and good practice in water management in other countries. This will help us understand where messages to conserve water have had greatest impact and reasons why this has been achieved, and to decide whether and where they can be used effectively in the UK.
**Additional memorandum submitted by the Consumer Council for Water**

1. This additional memorandum of written evidence provides the Sub-Committee with further information on the water affordability issues that exist now and highlights the actions that the Consumer Council for Water (CCWater) believes would need to be implemented as part of any compulsory metering programme to protect low income households.

**IMPACT OF THE 2004 PRICE REVIEW**

2. Affordability is a real issue in the water sector now. This was recognised by two House of Commons Select Committees during the period leading up to the outcome of the 2004 price review. Both recommended action by the Government to address the problem:

   — Environment, Food and Rural Affairs Committee “Water Pricing” (December 2003 and January 2005) recommended: “The Government should review the way in which poorer households are helped with water and sewerage charges. It should ensure that mechanisms to help people pay their water bills take account of regional variation in those bills.”

   — Environmental Audit Committee “Water: The Periodic Review 2004 and the Environmental Programme” (March 2004) recommended: “We strongly support the EFRA Committee recommendation that people suffering from serious difficulty in paying their water bills should be helped through the benefits and tax credits system.”

3. The outcome of the 2004 price review resulted in an average 18 per cent (plus inflation) increase in water and sewerage charges over five years. For 2005–06 the average water and sewerage bill across England and Wales is £278—an increase of 11.8 per cent (including inflation) on 2004–05. This will rise again in 2006–07.

4. The figures are worse for the South West where bills are the highest in England and Wales, there is an above average population of pensionable age, and in Cornwall the lowest level of earnings across England. The average water and sewerage bill in 2005–06 at £400 represents 7 per cent of the disposable income of a single pensioner receiving Pension Credit. By 2009–10 the situation will be even more exaggerated with the average water and sewerage charge for single pensioners living in the South West projected to account for closer to 8 per cent of disposable income based on current income levels. For single people in receipt of Job Seekers Allowance the situation is worse as the level of this benefit is lower than Pension Credit.

5. Expenditure at this level runs counter to the Government’s own sustainable development indicator (Q3) for measuring affordability for water at 3 per cent of income.

**CROSS-GOVERNMENT REVIEW OF WATER AFFORDABILITY**

6. On 2 December 2004 Defra published the Cross-Government “Review of Water Affordability” report. This review sought to take forward the recommendations from the Select Committees referred to at paragraph 2 above and set out a series of measures intended to help address water affordability. The former WaterVoice, responding on behalf of water customers, expressed disappointment at the outcome of the Cross-Government review citing the proposed measures as “tinkering at the margins and would do nothing to reflect regional differences in charges or address affordability in any meaningful way”. One year on the Government has yet to deliver any real solutions.

7. We wish to draw the Sub-Committee’s attention to Table B (reproduced at Appendix A attached) of the “Review of Water Affordability” report. This sets out by income group (based on the Family Expenditure Survey) the proportion of households spending more than the 3 per cent of disposable income on water and sewerage bills.

8. For 2005–06 for the lowest income quintile an estimated 32.3 per cent of pensioner households will spend more than 3 per cent of their disposable income on water and sewerage bills, this rises to 37.5 per cent in 2009–10. More worrying are the figures for non-working households without children—a figure of 51.7 per cent in 2005–06 grows to 55.0 per cent in 2009–10. These figures are based on average bills across England and Wales and will differ by company area.
9. Given that these households are in the lowest income quintile and are not working we believe they must be in receipt of some form of financial support through the benefits system. The fact that such a high proportion will be spending more than the Government’s own sustainable development indicator (Q3) for measuring affordability suggests that there are inadequacies in the amounts of benefit provided to help individuals pay these charges.

10. Research conducted by Equifax commissioned by UKWIR on behalf of Water UK to analyse the profile of outstanding revenue of the water sector indicates that in 2003–04 around 25 per cent of debt could be attributed to householders with incomes of less than £10,000 per year. In 2004–05 this figure has grown to 37 per cent. It is likely that households with income of less than £10,000 will be eligible for some financial support through the benefit or tax credit system.

11. The combination of numbers of householders with incomes of less than £10,000 who have not paid water bills and the proportion of householders paying more than 3 per cent of disposable income on water and sewerage charges suggests that existing Government support to low income households is inadequate.

12. The Sub-Committee will be interested to note that in Northern Ireland where water reform will introduce water charges for the first time in April 2007 the Government has announced a package of protections which guarantees that eligible low-income households should spend no more than 3 per cent of their income on water and sewerage charges. A water affordability tariff will be introduced, alongside a long-term transition to widespread metering, designed to ensure that those on low incomes are not penalised. In the announcement on 8 December 2005 Minister Sean Woodward said “...that it is the Government’s intention to pay for the protection for the less well off from public expenditure rather than the bills of other customers.”

13. We recognise that the water sector in Northern Ireland is not in private ownership and is very different to that in England and Wales. But this should not detract from the principle that the responsibility for provision of financial assistance to the least well off in society rests with central Government and should be applied consistently across the UK through general taxation.

14. CCWater has been working with a number of stakeholders (Age Concern, Citizens Advice, Help the Aged, National Consumer Council, Public Utilities Access Forum, Public Utilities Reform Group (PURGe), UNISON and Water UK) in lobbying the Government to introduce this type of protection in England and Wales. It is an essential element to a fair and affordable water charging system and serves to highlight what measures will need to be put in place should a compulsory metering programme be introduced to help address water resource management.

**Affordability and Compulsory Metering**

15. Existing protection for metered households is provided through the vulnerable groups scheme. But this has proved to be an inadequate measure. It has poor take-up with only some 7,000 out of a total 5.2 million measured households receiving the tariff. It is not an efficient or targeted way in which to provide financial support to people on low incomes. We think that individuals on low incomes who are least able to pay their bills should receive support through the wider social security and tax credit system. This is the most viable way of identifying and reaching customers in need. This scheme would become obsolete if the Government provided direct financial support through the tax credit and benefits system as outlined in paragraph 12 above.

16. Adopting a radical approach may be difficult but sometimes it is necessary to be innovative to effect change that will make a real difference. Help with water bills should be provided as an automatic right alongside other qualifying benefits through the social security system. This could be in the form of an individual allowance for water and sewerage charges included in the qualifying benefit, the issue of a voucher or passport on entitlement to a qualifying benefit or the introduction of a water charges benefit (akin to council tax or housing benefit). It could be provided to measured and unmeasured customers alike and remove the need for the ineffective vulnerable groups scheme.

17. This will require a shift in policy and acknowledgement by the Government of responsibility for the affordability of water as an essential service and as a social issue. Demonstration of commitment to such a change would complement its social exclusion and anti-poverty agenda and highlight the importance of water as essential for life and health consistent with the decision to ban the disconnection of domestic water supplies. It would, of course, require new resources but the Government already provides substantial funding to the energy sector, and pensioners in particular, to help combat fuel poverty.
20 December 2005

18. For 2004–05 the Department for Work and Pensions estimates its benefits expenditure on winter fuel payments at a total of £1,957 million with an extra £502 million in one-off payments to those over 70 years of age. That is almost £2.5 billion in one year alone to meet an objective to combat fuel poverty but these payments are made regardless of the income of the individuals who receive them. In addition further funding is provided to support energy efficiency measures in the home designed to help reduce fuel bills.

Opportunities

19. The Folkestone and Dover Water area, if successful in gaining water scarcity status would allow the Government to pilot a number of measures to explore how to address water affordability, although none would offer quick solutions:

— Smart meters with a range of new tariffs such as lifeline, or rising block.
— Financial support through Council Tax benefit along the lines proposed in Northern Ireland—application dealt with alongside application for Council Tax benefit.
— Water Direct—a more flexible approach to the operation of the scheme to extend participation in the scheme and encourage its use as a budgeting tool.
— Targeted water efficiency advice and assistance to measured customers qualifying for financial assistance—this would allow comparison with the water affordability pilot in the South West due to report in April 2007.

20. Our response to Defra on Folkestone and Dover Water’s application for water scarcity area status includes our views on the impact of compulsory metering on vulnerable and poorer customers and how the phasing of any programme may affect these households.

Conclusion

21. Any extension of metering must ensure that proper protection is provided to low-income households.

14 December 2005

APPENDIX A

Table B of Cross Government Review of Water Affordability report

PERCENTAGE OF HOUSEHOLDS SPENDING MORE THAN 3 PER CENT OF DISPOSABLE INCOME ON WATER AND SEWERAGE BILLS

<table>
<thead>
<tr>
<th>Average Income</th>
<th>2004–05</th>
<th>2005–06</th>
<th>2009–10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working household with children</td>
<td>1.2%</td>
<td>1.5%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Working household without children</td>
<td>3.2%</td>
<td>3.8%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Non Working household with children</td>
<td>16.5%</td>
<td>19.0%</td>
<td>23.0%</td>
</tr>
<tr>
<td>Non working household without children</td>
<td>29.9%</td>
<td>33.4%</td>
<td>36.5%</td>
</tr>
<tr>
<td>Pensioners</td>
<td>11.6%</td>
<td>13.6%</td>
<td>16.9%</td>
</tr>
<tr>
<td>All households</td>
<td>7.9%</td>
<td>9.2%</td>
<td>10.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lowest income quintile</th>
<th>2004–05</th>
<th>2005–06</th>
<th>2009–10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working household with children</td>
<td>6.3%</td>
<td>7.4%</td>
<td>9.5%</td>
</tr>
<tr>
<td>Working household without children</td>
<td>29.5%</td>
<td>33.2%</td>
<td>37.2%</td>
</tr>
<tr>
<td>Non working household with children</td>
<td>20.6%</td>
<td>23.3%</td>
<td>27.6%</td>
</tr>
<tr>
<td>Non working household without children</td>
<td>47.1%</td>
<td>51.7%</td>
<td>55.0%</td>
</tr>
<tr>
<td>Pensioners</td>
<td>28.0%</td>
<td>32.3%</td>
<td>37.5%</td>
</tr>
<tr>
<td>All households</td>
<td>29.4%</td>
<td>32.9%</td>
<td>36.9%</td>
</tr>
</tbody>
</table>
Examination of Witnesses

Witnesses: Dame Yve Buckland, Chair, Consumer Council for Water, Ms Teresa Evans, Chief Operating Officer, Consumer Council for Water and Dr Richard Sturt, Chair, Consumer Council for Water Southern, examined.

Q348 Chairman: Welcome, Dame Yve and your colleagues. Thank you very much for helping us once more. You helped us at our seminar and we are delighted you are able to join us again today. For members of the public, there is information available at the door concerning the terms of the inquiry. Dame Yve, would you like to introduce yourself and your team for the record.

Dame Yve Buckland: I have with me Teresa Evans, the Regional Officer, Consumer Council for Water and, has played a lead role in a number of the issues that I am sure you will be interested in and were part of our written submissions. I also have with me Dr Richard Sturt who is the Regional Chairman of the Southern Region, an area which suffers water scarcity and stress; and Richard also leads for the Consumer Council for Water on European issues. I am Yve Buckland and I am the Chair.

Q349 Chairman: Thank you very much. Before we launch into some of the questions we would like to ask, is there anything you would like to say by way of preamble?

Dame Yve Buckland: Yes, very briefly. We welcome the interest of this Committee in water management and we also particularly welcome the opportunity to come here and represent the interests of water consumers who, as you know, meet all the costs of investment in water and sewerage services—costs which have risen over the last year by 11 per cent and are set to rise by 18 per cent over the next few years—and for the majority of them, particularly domestic consumers, they have no choice in their provider and they cannot walk away from their services. We are delighted you have asked us here to represent their views.

Q350 Chairman: Thank you very much. Perhaps I could start by asking if you could tell us your key responsibilities and how you interact with Government and, indeed, the three water regulators. It might be helpful if you could explain to what extent you are a different organisation with a different operation from your predecessor WaterVoice?

Dame Yve Buckland: Thank you. The Consumer Council for Water is a non-departmental public body, which is sponsored by Defra and the Welsh Assembly Government; it is independent and at arm’s length from Ofwat, the regulator. WaterVoice was part of Ofwat. Although there was a clear separation between Ofwat and, in the latter years, between WaterVoice, WaterVoice was set up as a customer panel within Ofwat. We are independent and we were newly established at the beginning of October. We have a board of 13, which includes seven regional committee chairs; and those seven chairs cover 10 regional committees—Wessex, South West, North West, Northumbria, Yorkshire, Eastern, Midlands, Thames, Southern and Wales. Our regional structure does not follow the Government Office for the Regions’ structure; it follows the pattern of the water and sewerage companies and is closely dovetailed to the provision of water and sewerage services. Our key responsibilities are: to represent existing and future water consumers—that is, domestic consumers and business consumers; and includes of course the customers of licensed water suppliers in the new competitive market. We have a number of legal functions, duties and powers about providing advice and information to public bodies and to customers, to investigate complaints, and to publish information about complaints. We are also the first consumer body with a duty to contribute to the achievement of sustainable development. That is an issue that we are taking very seriously and we will be setting performance measures to assess what impact we have made and demonstrate where we have added value for customers generally and also in terms of our sustainable development duties. In setting ourselves up we talked to customers about what they wanted from a consumer body, and they highlighted for them the key issues for water and sewerage services as they see them. They want value for money; they want a fair and affordable charging system; they want their services to be right first time—that is, their problems sorted out quickly and without hassle; they want safe, clean drinking water; they want their water on tap 365 days of the year—a reliable and continuous supply; and, as far as the sewerage services go, they simply want to flush and go; they do not necessarily want to be faced with sewer flooding in the homes or issues and problems that arise from sewerage services. Our relationships between Defra, who in overall terms are our sponsor department, Welsh Assembly Government, Ofwat, the DWI and the Environment Agency will be conditioned by Memoranda of Understanding. We will have to formally set out, and are in the process of doing so, Memoranda of Understanding with those bodies. We have established good and appropriate relationships with Ofwat, which is respectful of our new status and our independence. We are working very collaboratively with Ofwat in our very early months. We are working towards good relationships with the Environment Agency. We are looking to
develop the Memoranda of Understanding with them. Interestingly, we are also looking to develop Memoranda of Understanding with Water UK on behalf of the water industry.

Q351 Chairman: So you see yourself very much representing the consumers' interests?
Dame Yve Buckland: Indeed.

Q352 Chairman: Does that include industry?
Dame Yve Buckland: Indeed, it includes business customers as well as domestic customers.

Q353 Chairman: How do you ensure that you know what industry’s requirements are?
Dame Yve Buckland: As we do with domestic customers, we set out to survey and ask business customers what they would want from the Consumer Council for Water, and we work through a business customers’ forum on the key issues that they face from their water and sewerage services.

Q354 Chairman: Just a question on funding. Do you have more money than WaterVoice would have had before; and do you have enough?
Dame Yve Buckland: We do have more money than WaterVoice because we are an independent body and, therefore, our overheads have increased. Our current budget, which is about £5.5 million, we think is sufficient for the task. Indeed, we see it as a very important issue for the Consumer Council for Water that we derive value out of that budget; because, of course, water customers pay for it in the long-term. We are looking to work within that budget, which actually is much smaller than a number of other customer bodies representing utilities’ customers. Nevertheless, we think it is sufficient budget and we can get great value from it.

Q355 Baroness Sharp of Guildford: I would like to explore your relationship with the water companies. I think you said you had a board of 13 of whom seven were—
Dame Yve Buckland:— regional committee chairs, representing the regions.

Q356 Baroness Sharp of Guildford: How were the committee chairs chosen?
Dame Yve Buckland: They were chosen through the open public and competitive process which we had independent oversight of. That was run through Defra.

Q357 Baroness Sharp of Guildford: What is the relationship that you have with the water companies? How far do you feel that they are offering good value for money to customers? Can I also take you up on one of the other statements that you made at the beginning in relation to the charging of customers, because you implied that at present customers have to meet the full costs of the infrastructure and development infrastructure. How far do you believe that this is appropriate, that the customer should be bearing these sorts of costs?
Dame Yve Buckland: If I start on the relationship with the companies and then I will ask my colleague Teresa Evans to come onto the issue around affordability and charging. We work with the industry at the national and regional levels. At the national level obviously we work closely with industry representatives—Water UK which has been here to give evidence. We participate in national working groups, such as the Debt Focus Group and Charging Effects Group, to bring the customer voice and the customer perspective. We also are playing a role in the new Water Savings Group, which has been set up under Defra alongside the water industry regulators. At the national level, therefore, we encourage the sharing of best practice. We represent customers’ views in general. We make an input into policy and other key national issues. Only yesterday Teresa and I were meeting a business customer network from Water UK. At the regional level each water company is allocated to one of our regional committees; and the regional committees have the responsibility to deal with complaints against the companies; but they also provide a sounding board for the water industry regulators. At the national level, therefore, we encourage the sharing of best practice. We represent customers’ views in general. We make an input into policy and other key national issues. Only yesterday Teresa and I were meeting a business customer network from Water UK. At the regional level each water company is allocated to one of our regional committees; and the regional committees have the responsibility to deal with complaints against the companies; but they also provide a sounding board for the water industry regulators. At the national level, therefore, we encourage the sharing of best practice.

Dr Sturt: I think it is a very important role, because we do understand the workings of the companies perhaps better than one might realise. We send in teams to have a look at their debts and their complaint handling, and they frequently consult us. I am often being rung up by managing directors of the five companies in my region and they may have a problem wanting to develop some new resources, for example, and want our support. There is actually a very good interplay of information between companies and the regional chairman.

Dame Yve Buckland: You asked about whether we think the companies are delivering quality and value—I suppose I should start by saying that customers tell us that, by and large, they are fairly, very or extremely satisfied with the levels of service being provided to them. Indeed, over half of all customers nationally consider their service to be fairly good, very good or extremely good. Those views and those feelings drop off the more money that
customers have to pay. You will be aware that in the South West, for example, where the bills are highest, perhaps 80 per cent above the average, customers are less happy. That brings into focus issues about ability to pay and affordability.

Ms Evans: In terms of affordability, we looked at a report that was undertaken by Defra across government that looked at water affordability in terms of the outcome of the price review last year. We were quite struck by the proportion of households that were looking to be paying more than three per cent of their disposable income in terms of water and sewerage charges. We look at the 3 per cent figure because Defra has a sustainability indicator within its quality of life sustainability area that suggests that is a good measure of whether or not people can afford to pay their water and sewerage bills. If you look at the national figures reported against that indicator it looks as if there are about 7 per cent of households that are paying more than 3 per cent; but when you actually drill down into the figures there are some quite startling statistics and we have provided details, with some additional written evidence, to the Committee. If I could just highlight one of them, for example, the non-working households without children, people within the lowest income quintile; these are probably people with earnings of certainly less than £10,000 a year. It is estimated that this year 51.7 per cent of people falling into that category are paying more than three per cent of their disposable income in water and sewerage charges, and that will grow to 55 per cent in 2009–10. If we look at pensioners, and again looking at the lowest income quintile, this year 32.3 per cent of pensioners are thought to be paying more than that three per cent indicator, and that will grow to 36.9 per cent. Those are based on average water and sewerage charges across England and Wales. If we then look at the figures for customers in the South West who obviously have higher charges than the average, those figures become even more startling. CCWater, and its predecessor WaterVoice, has been working with a number of stakeholders, including Age Concern, Help the Aged, Citizens Advice Bureau, the National Consumer Council and also the water industry Water UK, to lobby the Government to provide some financial support through the social security and tax credit system; because we feel that people who need financial support look to the safety net of the social security network for that support. We feel there is a good example which has just come through in Northern Ireland where water reform takes place in 2007, and the minister there has decided that for the first time they will address the issue of water affordability and water poverty and actually prevent it from happening, so that when the new reform comes in consumers there will be entitled to a water affordability tariff, which will cap their charges to the equivalent of this 3 per cent sustainability indicator. That money is actually being provided through government funding through the taxation system, and the Minister there, Shaun Woodward, has said that the cost will not be met by other consumers. What we would perhaps ask this Committee to look at with Government is that the fuel poverty agenda has been addressed by the Government and there are packages of measures which have been put in place, one of which is the winter fuel payments. If we look at that we estimate that last year the Government spent about £2.5 billion on winter fuel payments paid to all pensioners irrespective of income or need, and that is obviously an approach we much support; but we have estimated that there about five million consumers in England and Wales that are in receipt of a means-tested benefit. There are people who are in need and need support, and are probably falling below this sustainability indicator. We did some quick sums and estimated that if each of those received the equivalent of the basic winter fuel payment, £100, the cost would come in at about £500 million. That is a sizeable chunk of money but, to put that into context, that is actually one-fifth of the amount of money that is spent on winter fuel payments. That is an issue we are actually taking to Government to look at and explore in more detail.

Q358 Lord Whitty: We are just implementing the new Water Act which has not only created you but also made many changes to the licensing system and introduced, for larger users, an element of competition. What do you see as the potential benefits and downsides of the changes as far as consumers are concerned?

Ms Evans: Defra’s objectives obviously are that the benefits will bring to all consumers lower charges, better service and more innovative approaches to the delivery of services. We think the eligible customers, of which it is estimated there are about 2,200, will benefit we hope pretty quickly; but we also believe the system will drive up benefits for the remainder of the customer base, that is smaller business users and also the domestic customer base. We think that will come about in a number of ways: one is that it will allow better understanding of the water companies’ existing costs; because if competition is going to work we have to look at the discounts that are going to be offered in terms of the access price. We will only see movement if there really is true disaggregation of the costs of the retail activities that are used in calculating the access prices; because that will spur out the efficiencies and drive down costs and more efficient practices across the water industry, so that those benefits will come out for all consumers. We would hope that Ofgem would look at that at the next price review. We also expect to see more innovative...
approaches to the delivery of services; new methods of delivery; and greater efficiency. In terms of the focus of this inquiry, water management and water resource issues, we think the common carriage element should encourage the trading of unused abstraction licences and provide water resources for new entrants to be able to put into the public water supply. That, again, will have benefits not only for the eligible customer base but for the wider customer base because, by putting that extra water into the public water supply system, the existing water companies will be able to defer capital investment on water resource development and so reduce the onward costs to the customer base. I think we would say that the competitive regime is not the only way of looking at the better resource management. We believe that there is scope to look at this in terms of mergers. Perhaps I could ask Richard to pick up on the outcome of the Vivendi bid for Southern Water?

Dr Sturt: I was involved as the then Chairman of the Southern Region of WaterVoice in supporting the bid by Vivendi, now Veolia, for the shares in Southern Water. Vivendi at the time owned three companies, Folkestone & Dover in my area, plus Three Valleys and Tendring Hundred, and they still own those three companies. The issue was quite complicated because Ofwat argued strongly against the merger on the ground that it would eliminate at least one or possibly two comparators from the field of comparative competition which Ofwat relies on, not only for efficiency but in comparison of customer services, for instance. The argument that I put forward (which the majority of the Competition Commission accepted and the bid did not go through for the reasons I have mentioned) was that in terms of supply I argued that it would facilitate the construction of a ring main round Kent. If you think of Darwell and Bewl Reservoirs in the west, on the border with Sussex, and the water being taken from Bewl Water, which is now linked to Darwell incidentally, into Medway where it runs downstream and is abstracted and then carried across north Kent by a pipeline, you can see you have got the beginnings of a ring main there. There is now a link between Thanet and Deal and another one between Folkestone and Dungeness, and you could link them up without a huge amount of expense. That itself would be a highly desirable improvement to security of supplies in the south-east. There are arguments against it—I am not for a moment suggesting it was the only solution—but the ownership of Southern Water and Folkestone in the same group would undoubtedly have been an encouragement to make that sort of investment.

Q359 Lord Whitty: There seems to be two different philosophies here: one is effectively that larger is necessary to get the efficiencies, and the other is that we need more competition. By and large, the Water Act incorporated the more competitive philosophy whereas you seem to be saying a bigger monopoly supplier would help?

Dr Sturt: There would undoubtedly have been synergistic benefits. At the moment Folkestone & Dover relies on bulk supply from Southern Water which, when it expires, Southern Water will not have any obligation to renew.

Q360 Lord Whitty: In general would you favour the extension of the competition provision of the Act for smaller business and potentially to domestic users so that we get closer to the gas and electricity situation?

Dame Yve Buckland: We would indeed, because we are looking at the better resource management. We have talked to water customers and there is a growing expectation from them that they would like to see the extension of competition: but at the same time we also would not be against mergers, if that in itself was going to deliver better value. It is not one or the other we are arguing for here, but we think there is potential for both because of the nature of the industry. The other issue is about dis-benefits. Clearly we need to look carefully at some of the problems there have been about the extension of competition with the other utilities to try and avoid problems, and that is about working very closely with customers, and back-up schemes and reliable information on the kind of support that they would need.

Q361 Lord Howie of Troon: The ring main seems a pretty good idea. Is the merger necessary to produce it or can it be done without the merger?

Dr Sturt: It could certainly be done without the merger, but whether there is the will among the companies to put it together is another question. There is some collaboration between the companies now, because Bewl Water is three-quarters owned by Southern and one quarter by Mid Kent and so is the pipeline across north Kent. I would like to see more of this joined up thinking and it would certainly be easier to bring about if companies were in common ownership.

Q362 Lord Howie of Troon: Because without ownership you will be prodding them?

Dr Sturt: Indeed, yes.

Q363 Baroness Perry of Southwark: You say in your evidence that EU Directives have “potentially fatal flaws” in that they make hardly any reference to the need for cost-benefit analysis, and this you think could lead to problems in sustainability. How would you like the EU to alter its approach and in what way would you like it to change?
Dr Sturt: One starts with Article 174 of the Rome Treaty which for environmental schemes requires the Community to have regard to the costs and benefits of proposed actions or inactions. For some reason I cannot fathom that has never actually found its way into any of the Directives, such as the Habitats Directives, Freshwater Fish Directive, Shellfish Waters Directive or Urban Wastewater Treatment Directive. It is recited and referred to within the Water Framework Directive, which is surprising; but the problem is actually undoing both the lack of the cost-benefit requirement in the Habitats Directive in particular, but also the Urban Wastewater Treatment Directive and so on. The problem is not that these Directives are undesirable in themselves, but it always ends up with the water customer paying the cost, and if there is absolutely no real control over the cost and no real analysis as to whether something is worth doing, you get some quite outrageous examples of very expensive long-sea outfalls, for example, being required of sewerage companies when there may be cheaper and better alternatives for achieving the same objective.

Dame Yve Buckland: First, I note that we are drinking bottled water but I promise I will not tell Thames Water!

Q367 Lord Patel: Because we cannot change it here! We do believe it is tap water just put into the bottle! Dame Yve Buckland: It does not taste nearly as good. My background is a public health one and I would say I think we can be rightly proud in this country of the quality of the tap water that we have got. Whenever we speak to customers the safety of their drinking water is a key concern. It is the issue that people will speak to you about first when you talk to them about drinking water. We are aware that, over the two million water quality tests that are being carried out, we have now got up to 99.94 per cent of samples complying with the drinking water standards. That is good, but we cannot be complacent; and there have been recent outbreaks of cryptosporidium in Wales and elsewhere which has demonstrated the importance of the safety of the water supply. When we talk to customers, after safety they then talk about the taste, odour and discolouration elements of water, and those are all very important to them too. I am sure you will appreciate you can tell somebody that the water is very safe but if it looks brown you are not necessarily going to feel happy about drinking it. There was some funding in the last price review for improvements in taste and odour; I think there were 26 schemes across the nine companies to reduce incidences of discoloured water. WaterVoice supported those schemes and supported the funding of discolouration, taste and odour schemes across the various companies. I think we accept that 100 per cent of compliance is not obtainable anyway, given the issues around the responsibility of the water consumer, in terms of the water coming through their tap which itself can lead to some problems. Provided the customers are assured that the water they receive in their homes has been subjected to the full treatment in accordance with the drinking water standards, there should be no problem. Indeed, we also know that there are some recycling schemes being used in Essex and Suffolk, where in fact good quality, potable water has been brought about as a result of recycling. We accept it is necessary and we support expenditure, and so would customers, on that element of the service. We do not think we should be striving to 100 per cent.

Q368 Lord Patel: How do you manage their desire to have more pure water with the cost element? Dame Yve Buckland: I think it is a balance. It is one of the things that customers are prepared to pay for, but the cost of the quality of drinking water pales into insignificance against the cost on their bill of some of the things we have just been discussing, like the...
environmental improvements. We see this as the key issue for customers.

**Q369 Chairman:** In your written evidence you drew particularly in southern and eastern England, and drew attention to the plans for Sustainable Communities in the Milton Keynes, Cambridge and Stansted corridor and Thames Gateway and the like. Also you drew attention to the trend for smaller households and increased longevity; and all these things are going to require increased infrastructure. You have made it clear and make a strong case that the poorest in society should not be asked to pay more for this infrastructure. Who is going to pick up the bill for the remaining infrastructure? Is it something that should be paid for by the consumer?  
**Dr Sturt:** I think so. What I would suggest is that the obvious answer to the long-term need is more reservoirs. It is the most sustainable of possible solutions. Better, for example, than desalination plants. The good thing about something like a reservoir is that it is a very long-term asset. The cost of it can be spread over several generations of consumer, so that the value is spread not just to today’s consumer but tomorrow’s—and tomorrow’s consumer pays a fair share of the cost. That is a cost we would support, providing of course that the resultant costs. For our likely to be somewhat less rain in coming years, which has to be disposed of. It is not ideal. Furthermore, restricted to supplementing existing supplies at peak time when the rivers are at high flow and then they are not used in the most part directly for feeding the consumer; when water levels are low in rivers it gets taken out of the reservoirs and put back into the river. They act as a header tank for the river from which the abstractions actually take place.

**Q370 Chairman:** If the reservoirs were not considered a solution and desalination was, would the formula still be the same?  
**Dr Sturt:** Desalination is much more expensive operationally because it consumes huge amounts of energy and also produces a highly toxic waste that has to be disposed of. It is not ideal. Furthermore, you have to put the minerals back into the water time. If that was the case you would see no objection to their deployment. Is that still the case?  
**Dr Sturt:** Again, the South East has its own peculiar problems in that the reservoirs that exist, with the single exception of Weir Wood, are not actually fed by rainfall directly—there is no catchment—unlike the Elan Valley in Wales, for example, where the water just channels down the mountain into the reservoirs. In our case, what has to happen is that the reservoirs have to be topped up out of the rivers at a time when the rivers are at high flow and then they are not used in the most part directly for feeding the consumer; when water levels are low in rivers it gets taken out of the reservoirs and put back into the river. That is the benefit of the reservoir.

**Q371 Baroness Sharp of Guildford:** Is it not absurd that water is scarce and all these things will have an effect, but the problem is if we face a growth in population of, say, 18 per cent and improving leakage may yield 2 per cent and metering more people may yield 5 per cent, you can see there is still a huge gap that has got to be met.

**Q372 Lord Howie of Troon:** Reservoirs are a good idea—I rather like them—but they are dependent on having rain, are they not?  
**Dr Sturt:** Indeed.  
**Q373 Lord Howie of Troon:** The point I am after is this: the water in the river tends to be rainwater.  
**Dr Sturt:** We do not think it is one or the other, my Lady. There is a need in the South East, certainly, for all the expedients of improved leakage control; metering is desirable where water is scarce and all these things will have an effect, but the problem is if we face a growth in population of, say, 18 per cent and improving leakage may yield 2 per cent and metering more people may yield 5 per cent, you can see there is still a huge gap that has got to be met.

**Q374 Lord Howie of Troon:** We are told that there is likely to be somewhat less rain in coming years, which brings us back—  
**Dr Sturt:** That may well be true but, overall, we do not expect to see a large decline in the total amount of rainfall, it will just fall in larger dollops, if you like, and that is the time when you have got to capture it. That is the benefit of the reservoir.

**Q375 Chairman:** Dr Sturt, to take you back to the desalination plant, I think we recognise they are an expensive option but you did say in your written evidence that the use of desalination plants should be restricted to supplementing existing supplies at peak time. If that was the case you would see no objection to their deployment. Is that still the case?  
**Dr Sturt:** Yes, I see. Folkestone and Dover has a plan, at the moment, for a desalination plant for peak demands. The running costs are much less, obviously, if you only turn them on occasionally.

**Q376 Baroness Platt of Writtle:** What are you doing to promote increased water re-use, which you demand in your evidence, in new housing developments? Are there potential problems in terms of public perception of such initiatives?  
**Dame Yve Buckland:** Firstly, can I stress we did not demand this in our evidence. It seems to have come out that we have demanded it, but we are asking for
more research in this area because we do feel it is an important plank in the complex inter-related set of things that need to take place here in order to look at effective and efficient water management. The response to Defra’s Making Space for Water consultation that was made by our predecessor body, Water Voice, called for better and integrated drainage, planning and the use of sustainable drainage systems. CCWater has since added to the debate by advocating the development of water gathering systems channelling rainwater from roofs, looking at opportunities to use that kind of water for consumer and other purposes. We were calling, in our submission to you, for more research into the consumer and other purposes. We were calling, in looking at opportunities to use that kind of water for those sorts of things.

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down into tanks. Would you suggest something along these lines for architects designing new build?

Dame Yve Buckland: Having not experienced Bermuda in quite the same way I think the general point is that what we, as a customer body, are consistently asking for is that we look at the best available evidence and good practice from wherever we can find it, and we have been advocating that in terms of all the investment around water management and water safety. So we look globally at what is happening, what we can learn and how we might tailor it and apply it here. Whenever you try and bring something from another country, of course, it always has to be—I think what is called, in the jargon—acculturated; it has to be made fit for domestic consumers in the UK for very different attitudes, and we have to be aware of that; we cannot just change people’s lifestyles and behaviours very easily.

Q381 Lord Howie of Troon: You are trying to do that day-after-day. Might you not try the experience of Bermuda?

Dame Yve Buckland: I will certainly put it on my list.

Q382 Chairman: Do we need an accredited labelling system for water efficient appliances? Are you trying to get one?

Ms Evans: Yes. I think that is something we feel should happen. Certainly work is being taken forward by Defra. You will be aware that Defra has set up a water saving group and CCWater is very pleased to be part of that group. One of the strands of work that is taking place there is to look at the labelling and to look at what can be done to give consumers more information in terms of choice and understanding how much water devices are using, along the lines of energy efficiency, so that when they go to a shop for their washing machine or dishwasher or even a new lavatory they can understand how much water that device is going to use, and it is quick and easy information.

Q383 Chairman: Would you agree with me that, at the moment, there is some confusion in the minds of consumers? There are all sorts of labels, some of which claim to contribute to water efficiency but do not, to my mind, make any sense at all.

Ms Evans: I think we would agree with you and we want to work with Defra through the water saving group to try and develop a new system.

Q384 Chairman: Who owns this problem? Is it you or Defra?

Ms Evans: Defra, in conjunction with all the other partners within the water saving group. Defra actually own it, yes.

Dame Yve Buckland: We certainly would advocate it. If I might add, I think you are absolutely right, the labelling can be confusing, and even if the labelling then becomes more straightforward there is an issue about encouraging consumers to comply. If you do a little bit of research you will discover that most people have water-saving and energy-saving systems on their washing machines but most of us run the same programmes because it is quick, it is easy, we know those programmes and that is about our lifestyle. That is the point we are trying to make. We have to tackle this from a number of perspectives. Certainly, improving information and making it simpler and providing people with the means is one element of it, and then some sustained work on encouraging consumers to continue to change their lifestyle and behaviour is important.

Q385 Baroness Platt of Writtle: You have partially answered what I was going to ask because I do have a washing machine that has a “half load” and a “full load”, so I would wait for a full load, if that works, or otherwise go for a half load. Certainly with the dishwasher I would wait until it is full, but that needs to be put over to the public. How are you doing that? Or are you leaving it to somebody else to do it? Are they doing it?

Dame Yve Buckland: Firstly, we see ourselves as having a role in providing that kind of advice and information to the public, but as just one of a number of players. We are a very small body and we need all of the players—the industry, the Government, the water companies and the media—to be putting these messages across. What we are doing is trying to understand how consumers behave and how we might understand how they might be changed. We are looking at the evidence of the way in which we change customers’ behaviour.

Q386 Baroness Platt of Writtle: You are fairly early on, at the moment.

Dame Yve Buckland: We are very early on, but there is a lot of work that has been done around things like social marketing in relation to health, for example, that we can learn from and adapt very quickly. All of that demonstrates that it is about providing information in accessible ways and then understanding the way people live their lives in order that they can put that information into practice.

Q387 Baroness Platt of Writtle: Short, sharp messages but not too complicated.

Dame Yve Buckland: In our research consumers do see us as a customer body, a representative body, but at the same time they will take most of what they learn from the wider media. So it is influencing in the wider media. Our customer groups say, “We would like to see you on the TV doing campaigning”. Those
sorts of campaigns are very expensive. What we are trying to do is penetrate the consumer market, consumer literature, using things like Woman's Hour to tackle women in the home, and using things like Good Housekeeping. That is how people really receive messages that reinforce that they need to make a behaviour change. Those are the sorts of things we can explore.

Q388 Lord Patel: You, in your evidence, are encouraging the use of water meters. You would like to see them introduced. Is the technology available for smart water meters and is there not a cost? Who will meet the cost? How will the consumer benefit? For instance, what tariffs would you like to see being introduced and would not households that have a large number of people, if they were escalating tariffs, be disadvantaged?

Dame Yve Buckland: Clearly, our campaigns are very expensive. What we are trying to do is penetrate the consumer market, information is that it is about twice as much. That is our best available information. We are using things like Woman's Hour to tackle women in the home, and using things like Good Housekeeping. That is how people really receive this information.

Q389 Lord Patel: Who do you think will meet the cost?

Dame Yve Buckland: Ultimately water customers have to meet all of these costs and so what we are saying is we think there is potential here for this to really provide a basis for better services to customers, but we need to understand the technology and we need the chance to pilot the technology. We think that the Folkestone and Dover water scarcity application would be a real opportunity to pilot that kind of technology before it is rolled out.

Q390 Chairman: Are you confident it would only be twice as much?

Dame Yve Buckland: It may be more. Our current information is that it is about twice as much. That is our best available information.

Q391 Lord Patel: What are you doing now to encourage unmetered customers in water efficiency?

Dame Yve Buckland: Clearly, we go back to the sorts of issues we were talking about earlier in terms of getting people to recognise there is an issue and to make changes in their lifestyle and their behaviour. We also want to point out that universal water metering is not necessary in all parts of the country. We talked about areas in the north, for example, and other areas of the country, where they do not have a water shortage problem at the moment. Clearly, it is much more difficult if you are trying to get people to get their awareness generally raised, and if you look at the work that has gone on in sustainability in other areas, it is working with children and the younger generation, I think, that most advances have been made; it has almost skipped a generation to get the younger population to recognise the wider environmental issues and to see water as a key resource and good. The water companies do a lot of work with schools. So we see metering as a way of helping to measure demand, we see we have to work with a wide variety of customers in terms of trying to change their behaviour, but it is a much more difficult set of issues that are involved.

Q392 Lord Patel: Is there not a problem that if one area, because there is water, does not have smart metering and another part of the country does, because there is a water shortage, at a cost to the consumer which might be more than double the cost, the consumer will say, “It is obviously the water company that is the problem”?

Dame Yve Buckland: Well, you get those issues replicated right across the country in relation to what people are currently paying around the environmental schemes, for example; the water bills are different and they recognise local situations and local circumstances. That can be a problem for customers to understand, particularly where you can have water companies dividing a street and there is a difference in cost between, almost, one side of the border and the other.

Ms Evans: Can I add a point there? I think the cost of the smart meters longer term could be offset against the costs of resource development. It is one of the package of measures that need to be assessed as part of the impact of metering on demand management. So, taking the Folkestone and Dover case, if the water scarcity status is granted and a compulsory metering programme goes ahead and smart meters are put in, they may be more expensive in the short term than conventional meters but longer-term the benefits may be greater. It may be that over that...
period of time customers actually pay less in that particular area because the smart meters are giving customers more information; it is making them think more about how they use their water and the opportunities of new tariffs that have been introduced. The greatest time of peak demand is during the summer teatime when garden-watering takes place—hosepipe use—and if you have smart meters you can introduce peak time-of-day tariffs and that might be a way of getting a signal across to consumers that actually water is a very precious resource at that time of day and to encourage people, if they are going to do garden watering, that it is later in the evening which, actually, would be better for the garden than when the ground is hot. So smart meters may appear to be expensive when looked at against the cost of conventional meters, but I think it is a question of looking at the whole picture and looking at the benefits of smart meters against all the other benefits that may come out and assessing those against the costs and looking to see what is going to deliver value-for-money for the consumer and ensure security of supply.

Q393 Lord Howie of Troon: You have partly answered my question, but I am wondering what a smart meter actually does. You tell me it can measure water consumption at various times of the day. That is not really particularly smart. Can it distinguish between water which actually is being used for watering the garden and water which is being used for more legitimate means?

Ms Evans: It would depend. It could be that people have a sub-meter fitted on the garden tap, so that that would then register the amount of water—

Q394 Lord Howie of Troon: That is not a smart meter, that is a different meter.

Ms Evans: It could be that the technology needs to understand that a smart meter will record the water at particular times of day and then download that information. It is where it is located.

Q395 Lord Howie of Troon: You might be having a bath. Is there not an element of fantasy about this?

Ms Evans: We think, longer term, there are benefits that could come out of smart meters. One of those would be in terms of billing. Metered customers generate far more complaints than unmetered customers because they have queries about estimated bills, about bill readings and so forth. If you have a smart meter then it is taking a more accurate reading, and that would have other benefits, too.

Q396 Chairman: I think you will have an opportunity in January to see some smart meters. Could I ask you whether you favour the creation of a Water Savings Trust?

Dame Yve Buckland: We were not in favour of the creation of the Water Savings Trust. We are part of the cross-industry, cross-regulator group that is looking at water savings. The reasons for that were that, firstly, that was largely modelled on energy saving, and that depended on energy, of course, being wholly metered or largely metered, and it is a different set of issues for water, as we see it. Secondly, we think it is very confusing for consumers to have all these different bodies that are talking to them and trying to work with them. We advocated that, because of the costs involved, also we should look at what the existing parties can do between them, recognising that that is going to need a real drive around some targets and some momentum given to us by Defra in order that we deliver. If this fails to deliver then maybe the Water Savings Trust comes back into play, but in terms of the early proposals we would not.

Q397 Lord Howie of Troon: Earlier on, Ms Evans explained with some care why some people should be helped to pay water bills. What is meant by the three per cent of disposable income?

Ms Evans: We have looked at that figure because Defra have set it as a sustainability indicator. In the fuel sector there is a figure of 10 per cent of income spent on energy costs and anybody paying more than that is regarded as being in fuel poverty. That was set as a trigger for the Government to introduce measures to address fuel poverty in that sector. We feel that if Defra has introduced a sustainability indicator set at 3 per cent (and I cannot comment on the calculation of that 3 per cent, that is obviously something for Defra) and that is one of the quality of life indicators, then we question why there is such a proportion of people paying more than that amount of their income on water and sewerage charges. To draw a parallel with what has happened in the energy sector, that if the Government has found the money to address poverty in that sector, when water is such an essential basic for human life why is the Government not looking to provide some funding through central government, or the social security system, to help address the poorer consumers?

Q398 Lord Howie of Troon: If water is a necessity of life, why not bread?

Ms Evans: We are responsible for representing the interests of water consumers and we are bringing their views to this Committee and to the Government, and we are only tasked to look at those issues. The social security system provides a basic allowance for everyday living, and within that would be the element of food.
**WATER MANAGEMENT: EVIDENCE**

**20 December 2005**

Dame Yve Buckland, Ms Teresa Evans and Dr Richard Sturt

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**Q399 Lord Whitty:** What are you saying here? Apart from the Winter Fuel Payment, which is an enormous cost and does not require pensioners to spend the money on fuel, and therefore may not have any effect on use of energy, you have got the *Warm Front* programme to improve the efficiency of the system and then you have got various obligations on the companies but you do not actually have the Government paying the bills. Insofar as somebody pays the bill then it is the other consumers. You seem to be resistant to the other consumers paying the bill if you are, essentially, discounting the poorer—

*Dame Yve Buckland:* We are, the reason being there is a large and growing amount of debt. Whatever the percentage, the water companies and the industry would agree, there is a large and growing amount of debt among water consumers. A significant proportion, about a third, of people struggling to pay earn less than £10,000 a year. You might argue three per cent of disposable income but we know that in the South West we have pensioners on Pension Credit who are paying seven to eight per cent of their pensions on water. It is a crucial issue, we think, that needs to be tackled. Why not bread? You might argue why not rail travel, where part of the infrastructure is funded by government. It is a national infrastructure that gets funded by government and the rest is picked up by the ticketing.

**Q400 Lord Howie of Troon:** It would have been better just to increase the pension.

*Dame Yve Buckland:* If we can see that there is a discernible element going in to cover water, yes.

**Q401 Baroness Platt of Writtle:** Are you concerned about the level of unpaid bills, particularly since a large proportion of these are owed by customers who can afford to pay? How can the industry act to reduce the number of defaulters?

*Dame Yve Buckland:* There are no easy answers on this one. As I said, the debt is growing. In addition to the “can’t pays” there are a group of “won’t pays”, although sometimes there is not a strong demarcation line between those two, and there has been some recent research which has started to look at the amount of debt and the moneys owed by individuals and the way it breaks down. I quoted some of those figures earlier.

**Q402 Baroness Platt of Writtle:** Where you think they can pay you take them to court, do you?

*Dame Yve Buckland:* The water companies would pursue debt recovery action. It is extremely difficult for the water companies to do that through the courts because they do not have a statutory right to an individual’s name; they actually bill the occupier as opposed to an individual. So for a very canny individual who wants to get out of paying there are a number of routes open to them at the moment, and we believe the water companies’ arm ought to be strengthened in that respect in order to pursue the “won’t pays”, because of course we all end up picking up the tab. There is cross-subsidy going on as a result of that. It is a very difficult issue to try and highlight because, of course, by highlighting it you actually make more people aware that it is relatively easy not to pay your water bill, so we have to tread very carefully on those kinds of issues, and we are working closely with the water companies.

**Q403 Chairman:** Is there a solution? Let us separate those people who cannot from those who will not and recognise that, at the moment, the odds are stacked against the water companies for the reasons you have just explained. Is there a recommendation you think is lurking there which you think we should highlight?

*Dame Yve Buckland:* We are encouraging the water industry to identify and show best practice in this respect in terms of targeting persistent non-payers while dealing with the genuine “can’t payers” very sympathetically. We are encouraging them to look at the most efficient debt recovery approaches for different types of customers—for example, what measures trigger contact and payment from customers to improved cash flow—but there are no easy solutions to this, I am afraid.

**Ms Evans:** We think around 51 per cent of debtors are tenants. The legislation provides that it is the occupier of the property that is responsible for payment of the water and sewerage charges and there may be a case for landlords of those short-term tenancies to become the person responsible for payment of those charges. That is something the water industry has been exploring and looking at lobbying for in terms of changing legislation.

**Q404 Chairman:** So a short-term tenancy payment would include water?

**Ms Evans:** Yes.

**Q405 Chairman:** That would not be much incentive to use your water economically, would it?

**Ms Evans:** No, but at the moment there is no incentive for landlords to notify the water companies of a change of tenancy. It is up to the individual occupier to go to the company and say, “I have moved in”. As Yve was saying, if people know how to play the system they can move into a property, not inform the water company and, if it is a short-term let, they can be gone and the water company do not even know they have been there and moved on. One way of overcoming that would be to make the
landlords responsible for payment of the water and sewerage charges.

Q406 Baroness Perry of Southwark: A final thought: is there room for a more radical solution, to decouple water rates from Council Tax?
Ms Evans: At the moment, people pay water and sewerage charges directly—

Q407 Baroness Perry of Southwark: Yes, but they are paying on the basis of what the rateable value of their property is, as opposed to what their income is. Is there a possibility of a more radical solution, of not tying it to the value of the property and tying it to the individual?
Ms Evans: That is an option. As part of our work programme going forward, we intend to look at the whole agenda of paying for water on the basis of charging both for measured customers and unmeasured customers. We are about to come into a new charging year from April 2006, and 75 per cent of the customer base are unmeasured, and one of the major calls that most of our offices receive is: “Why am I still receiving a bill based on the rateable value that is non-existent?” So there is a case to look at the whole basis of unmeasured charging alongside metering as well.
Dame Yve Buckland: Water has been sadly lacking, my Lady, from all the current reviews of Council Tax and a local income tax—it has not featured. We have been disappointed in that.

Q408 Baroness Perry of Southwark: Of course, universal metering would solve the problem, but we are a long way from that.
Dame Yve Buckland: We are indeed.

Q409 Chairman: I think we have come to the end of the questions we asked you to help with. Thank you very much for joining us. We are very grateful to you for your evidence today. We will think very carefully on some of the issues that you highlighted. Once more, thanks also for the two pieces of written evidence you submitted.
Dame Yve Buckland: Thank you very much for giving us some time and space, and can we also wish you a Happy Christmas.
EXECUTIVE SUMMARY

1. Drainage and water abstraction are drying out many of the wetland habitats of lowland England. Climate change will put extra pressure on the water dependent environment. We need to act now to remedy current adverse effects and, at the same time, provide the right conditions to enable adaptation of the environment to these new conditions, for example to facilitate migration of particular species to new suitable habitats.

2. Abstraction is considered a cause of unfavourable condition in around 7 per cent of the standing water and 14 per cent of the area of river Sites of Special Scientific Interest (SSSIs). In the recent (2004) water company price review exercise (PR04) schemes or investigations due to abstraction by water companies were identified as necessary to deal with problems affecting 60 SSSIs.

3. Action to tackle over abstraction needs to be taken before damage becomes visible. A suitably precautionary approach, based on best available information, must be therefore be factored into strategic planning for water demand. It must also be taken into account in the development of technical solutions to long-term water management. To enable this, English Nature has, with the Environment Agency, developed thresholds for the water resource needs of a range of freshwater and wetland habitats. These are currently being applied in assessments of impacts of water abstraction on Natura 2000 sites and other SSSIs.

4. Understanding of the detailed water resource requirements of freshwater ecosystems is poor, and the breadth of sound knowledge is limited. There is a strong need to instigate a major research programme looking at both ecosystem functioning and practical thresholds for water resource needs of ecosystems, in order to improve impact assessment and management criteria.

5. Drought can have a major effect on landscapes, both directly through its impact on semi-natural habitats, and indirectly through the need for infrastructure development especially in and around towns. Possible ways of integration into the existing landscape and exploration of multifunctional uses for the benefit of people and nature must be examined.

6. It is increasingly necessary to develop partnerships to achieve a more co-ordinated and integrated approach to water management, and gain multiple benefits from increasingly scarce water resource. A more holistic approach is required, including action to improve aquifer recharge though changed land-use in main recharge areas. The role of incentives for farmers, and of the water companies, in such a process and potential links with other public benefits such as biodiversity and landscape gains, merits further investigation.

1. INTRODUCTION

A new organisation—Natural England—is being created with responsibility to conserve and enhance the value and beauty of England’s natural environment and promote access, recreation and public well-being for the benefit of today’s and future generations.

The creation of the new organisation, Natural England, has already begun, with English Nature (EN), the Landscape, Access and Recreation division of the Countryside Agency (LAR), and the Rural Development Service (RDS) working together as partners. This natural partnership is delivering joint outcomes and paving the way for Natural England, whilst continuing to deliver their separate and respective statutory duties:

— English Nature is the independent Government agency that champions the conservation of wildlife and geology throughout England.

1 Special Areas of Conservation designated under the Habitats Directive, and Special Protection Areas for Birds under the Birds Directive.
The Rural Development Service is the largest deliverer of the England Rural Development Programme and a range of advisory and regulatory rural services.

The aim of Countryside Agency’s Landscape, Access and Recreation division is to help everyone respect, protect and enjoy the countryside.

This consultation response has been produced jointly by English Nature, the Rural Development Service and the Countryside Agency’s Landscape, Access and Recreation division who are working to create Natural England, a new agency for people, places and nature.

2. General Background to our Response

2.1 The emphasis in this response to the call for evidence is on the problems of water supply for wildlife and the natural environment, and the approaches being undertaken to assess the risks and to tackle the problem. We focus in particular on the implications of water resource management for achieving the SSSI (Sites of Special Scientific Interest) PSA target for water dependent features and the need to protect Natura 2000 sites (designated under the Habitats and Birds Directives) from damage or deterioration as well as the need to tackle water resource problems in the wider environment. The state of protected nature is a good indicator of the health of the wider environment, and action that secures a good status within protected areas (including the development and wider promotion of best practice) can benefit a much wider area.

2.2 Water—seen and unseen—is a critically important component of landscapes—be it open water such as rivers, lakes and ponds or supporting wet grasslands, fens and bogs. As such it is critical for conserving and enhancing the quality of landscapes, and is equally important for the amenity value of those landscapes for people taking recreation within them. For people seeking recreational experiences, the quality of water—sight and smell—is as important as its quantity.

2.3 Water management to protect nature conservation can conflict with the requirements of other users. There is potential, and it is increasingly essential, to develop partnerships to achieve a more coordinated and integrated approach to water management, and gain multiple benefits from increasingly scarce water resources. We outline the changes facing agricultural use of water, and provide examples of approaches which have attempted to take account of the needs of a range of stakeholders, including agriculture. Increased promotion and development of such approaches as normal best practice, would encourage their recognition as the optimum solutions both commercially and environmentally.

Responses to Specific Questions

What are the causes of the current problems of water supply, and how serious are they?

3.1 Balance of supply and demand

3.1.1 Demand for water (for domestic and industrial use) is related to the geographical spread of customers. The magnitude of the demand is affected by the water needs of the customer (what is the water used for) and the efficiency of its use (for example in minimising leakage, use of process water for recycling and minimising atmospheric loss during irrigation). Demand can further be managed through the efficiency of the water undertaker or abstractor in ensuring that the water supplied matches the quality required for the job (watering a garden lawn does not need highly purified water, whilst the irrigation of salad crops might need higher quality of water than crops which are highly processed after harvest, and drinking contaminated water is a health risk).

3.1.2 Domestic use of water in England (about 150 l per person per day) is still much larger than comparable European states, such as Denmark (135 l per person per day) where water saving in households is common practice. The efficiency of the water companies’ supply route is improving, but there is still significant loss of abstracted water in the supply chain (up to one-third of the abstracted water) by certain companies (OFWAT, 2004). This quantity of water would equate roughly to that necessary to compensate for all water that needs to be relinquished to tackle the problems currently identified in statutorily protected sites (ie Natura 2000 sites and SSSIs).

3.1.3 The Environment Agency’s assessment of the need for abstraction licence changes to restore sustainable abstractions (Environment Agency, 2005) attributes around 93 per cent of the projected costs of licence revocations to abstraction by water companies, but also a significant proportion (7 per cent) to abstraction...
for agricultural irrigation. Agriculture is the third largest user of water behind business and industry, with the largest user sector being domestic consumption. The peak usage time in agriculture for irrigation is in summer, which can coincide with the most vulnerable time for water dependent environmental habitats. It is also the peak usage period for domestic demand.

3.1.4 Agricultural production patterns are already being affected by changes in water supply. Longer term unpredictable water supplies due to changing weather patterns may be inadequate to replenish storage and reduce the viability of a farm or area for current production. This is leading to movement of production to other areas, in UK or abroad, where water for irrigation is available. This increases the demands for water use and storage, and leads to land use changes in these areas, which will then impact on the local environment. There can be considerable local social consequences (such as for rural employment) following such changes in scale and geographic distribution of agricultural production.

3.1.5 Landscape and biodiversity impacts of water supply shortages are not restricted to water and wetland features. Drought can have a major effect on tree populations, with potentially huge impacts on landscapes such as hedgerow trees, ancient woodlands and parklands. The potential increasing need for infrastructure—purifying installations, reservoirs, Sustainable Urban Drainage systems (SUDs) etc—could have a considerable impact on the landscape especially in and around towns. In response, possible ways of integration into the existing landscape and exploration of multifunctional uses for the benefit of people and nature must be examined.

3.2 How serious for biodiversity are the water resource problems?

3.2.1 Water dependent (protected) ecosystems, such as rivers, lakes and certain wetland types (eg fens and raised bogs), were (with exceptions such as reservoirs and coastal freshwater grazing marsh) formed over a long time span, under situations where water levels and flows were not greatly influenced by abstraction. Such water dependent ecosystems rely heavily on a natural supply of water, in the right quality and quantity, both in terms of absolute level and the variations in supply within and between seasons, and between years. For example, a river may rely on high flows to maintain geomorphological processes, such as erosion, which can clear gravel beds from silt, and provide the spawning habitat required by salmon. Freshwater flow pulses provide the trigger for migrating fish, such as salmon to move up river to their spawning grounds.

3.2.2 Drainage and water abstraction are drying out many of the wetland habitats of lowland England. The effects of over abstraction are evident in fens, rivers and lakes, as well as other wetland habitats such as wet woodlands. Restoration of habitats such as degraded raised bogs may require the reduction or prevention of groundwater abstraction from aquifers lying beneath them (Townshend and others 2004). Abstraction is considered a cause of unfavourable condition in around 7 per cent of the area of standing water and 14 per cent of that of river SSSIs (English Nature, 2003).

3.2.3 The scale of the current water resource problem associated with water quantity management issues is apparent from the recent water company price review exercise (OFWAT 2004) in which schemes or investigations due to abstraction by water companies were identified as necessary to deal with problems affecting 60 SSSIs and Natura 2000 sites.

3.2.4 The final ministerial guidance to PR04 (Defra 2004) announced changes to the method for funding the implementation of these schemes. These will now need to be funded through compensation payable by the Environment Agency upon direction of the Secretary of State after modification or revocation of an abstraction licence. This has created a significant financial imbalance in meeting the requirements for restoring sustainable abstractions affecting designated wildlife sites, (Environment Agency 2005). It seems that this will only be partly addressed through the current proposed changes in abstraction charges.

3.2.5 Different river types require different conditions to maintain their characteristic features. English Nature has therefore derived a series of maximal deviations from the natural flow that would not compromise the plants and animals that are dependent upon flow regimes, and which are protected under national and European legislation. These criteria are used to set abstraction limits and thus affect the quantity of water available for human use. The criteria are based upon the Environment Agency’s flow criteria in the CAMS (Catchment Abstraction Management System) process that assesses sustainable water management. The family of flow criteria is based on the sensitivity of a river to abstraction, where high energy upland rivers are more susceptible to abstraction than slow flowing lowland rivers.

3.2.6 In the case of other wetland habitats, for example alkaline fens, joint Environment Agency, English Nature and Countryside Council for Wales research has made major progress in defining the water quantity thresholds required to maintain the relevant habitat, and which again has implications for water resources...
available for abstraction (Wetland Framework Project: Environment Agency and University of Sheffield 2000; Hydro-Ecological Guidelines: Wheeler et al, 2005). This research both categorised the different mechanisms that supply water to a range of wetland types (WETMEQs) and identified quantity and quality thresholds that are conducive to a healthy wetland. The results of this research are used to identify situations where the supply is compromised and therefore provide the Environment Agency with the evidence to solve the damaging abstraction, in particular during the course of its review of consents affecting Natura 2000 sites under the Birds and Habitats directives.

3.2.7 The relationships between water quantity and quality parameters on the one side and ecosystem health on the other are however not linear. For example, long-term lowering of the water table in East Ruston fen, a peat based wetland, has resulted in the drying out of the top layer of the peat, with subsequent oxidation of the soil itself. This has led to the release of nutrients from the peat into the fen substrate. Further, the lowering of the soil surface may lead to flooding of the peat surface when the water table in the soil is restored, and so prevent restoration of the original vegetation community. This example serves to highlight the need for a precautionary stance, requiring action to remove the risk to the hydrological requirements of the freshwater ecosystem before the impact becomes significant, or a situation has been established that prevent a restoration to the desired state.

3.2.8 The water resource criteria described above are being used to assess the risks of abstraction to the integrity of Natura 2000 sites and the impacts of abstraction on the conservation status of SSSIs. They are subsequently used in determining the management of water resources in the relevant catchments, such that the integrity of these sites is protected or favourable condition restored. The same criteria are playing a significant role in the implementation of the Water Framework Directive in England, and especially in determining whether the status of a groundwater body may significantly damage a groundwater dependent terrestrial ecosystem. However understanding of the detailed water resource requirements of freshwater ecosystems is poor, and the breadth of sound knowledge is currently restricted to peat based wetlands (fens and bogs) and wet grasslands. A long-term research program is required that generates and collates field data, furthers our conceptual understanding of the functioning of the particular ecosystems, and derives impact assessment and management criteria.

3.3 Future prospects for water supply

What are the projections for future water supply, and what factors will influence these projections? Where, and over what timescales, may problems emerge?

3.3.1 The UK Climate Impacts Programme (UKCIP02) projects considerable changes in precipitation over the UK during the 21st Century. Winters are likely to become wetter and summers drier, continuing the trend observed in the last century. The frequency and intensity of winter precipitation will continue to show a marked increase, and very dry summers might occur in 30 per cent of years by the 2050s. The largest changes in precipitation are likely to be experienced in eastern and southern England, and the smallest in the north-west of Scotland. Depending upon levels of greenhouse gas emissions, winter increases in precipitation could range from between 10–15 per cent and 15–35 per cent, and summer decreases from up to 35 per cent to 50 per cent or more. Soil moisture would decrease across the whole of the UK, with reductions of 20 per cent to 40 per cent being experienced in south-east England.

3.3.2 The consequences of more intense rainfall events for water supply, depends on the route that the water takes. If the water infiltrates into the ground, then the similar overall rainfall quantities will result in a similar resource. However an increased frequency of intense downpours will result in increased runoff towards rivers without replenishing groundwater reserves. It is therefore likely that under un-managed conditions groundwater sources will become less reliable and rivers will suffer more high flow events, which could result in more flooding of towns and cities. This increase in flooding frequency and duration could affect both the river habitat (excessive erosion) and wetlands (shift towards more flood tolerant communities, and deposition of nutrient rich silt). For water supply and storage, we will need to rely on more integrated solutions, beyond reservoir development, and investigate in more depth ways of enhancing groundwater recharge.
10 January 2006

4. The Response Needed

4.1 Is sufficient research being devoted to predicting, and handling, possible future scenarios?

4.1.1 English Nature is contributing to research to assess the impact of the change in climate on freshwater ecosystems (the Environment Agency led PRINCE project—Preparing for Climate Change Impacts on Freshwater Ecosystems). This will need to be followed by scenario painting that includes varying needs of water dependent natural ecosystems and the nature of the adaptation responses that should be pursued to enable sustainable freshwater ecosystems under climate change. Such research needs should include: the nature of adaptation required in nature conservation objectives to take account of change; approaches to optimising the adaptation of freshwater habitats to climate change consequences within a given location; and approaches to encouraging the re-establishment of freshwater habitats in new locations in response to shifting environmental constraints.

4.1.2 Underpinning this research is the need for a thorough understanding of the water requirements (quantity and quality) of freshwater dependent ecosystems. Although considerable progress has been made with some habitats, such as peat-based ecosystems and wet grasslands, there is a strong need to instigate a major research programme looking a both conceptual functioning and practical thresholds for the full range of water dependent habitats, as discussed in Section 3.2. A thematic hydro-ecology program under the research councils seems the obvious place for this research.

4.2 Is the response of Government, the EU, regulators and the industry adequate?

4.2.1 Long term planning in water resource management in this country is currently steered by the Environment Agency. A strategic view of the water management should include an assessment of the needs of the water dependent environment in the changing world. Due to limitations in the understanding of the water resource requirements of freshwater ecosystems, and conflicting requirements in subsequent management options: For example, how will we deal with drought orders/permits with change in recharge pattern and quantity which may be due to change in rainfall (eg cloud burst, initiating run-off rather than more steady recharging rain) and storage efficiency). This is only incompletely taken into consideration in long term planning.

5. Supply and Demand

5.1 What are the options for increasing water supply, and what are the arguments for and against?

5.1.1 The quantity of water available for use, eg “supply” is a function of the quantity abstracted and losses during the storage, purifying and transport process. In considering usage requirements, the quantity of water needed (the demand) should be differentiated according to the particular quality need (eg drinking water has different quality requirements to that for flushing of toilets). The supply of some of these categories can be increased through harvesting of rainwater, and local use (SUDS, use of rainwater for garden watering, flushing toilets etc). Rainwater harvesting is technically feasible and could be retrofitted in many built environments. The supply of clean drinking water can be increased though the reduction of the large loss during transport (currently 20 to 30 per cent by volume). Industrial water users should also review their quality (and quantity) needs and could opt for use of cleaned effluent where applicable.

5.1.2 There a case to be made for collecting and storing more water through increasing reservoir capacity, either on-farm winter water storage for irrigation, or large scale for domestic and industrial water supply. However this has to be balanced with the environmental effects that this will have. The implications are not necessarily negative—the right design in the right place may bring environmental benefits and provide recreation opportunities over and above the primary water management objectives. Location and design need to take the character of the location into account from the outset—an issue for Regional Spatial Strategies and Local Development Frameworks to address.

5.1.3 Responsible water companies in SE England are concentrating on solutions that ensure extra supply in the region (eg increasing capacity of reservoirs, building new reservoirs). This will not be adequate in the longer run, as climate change is likely to bring concentrated rainfall over the winter season which will lead to summer shortages, whilst increased temperatures will increase evaporation, especially during summer. Efforts need to be made to improve efficiency of use and to exploit other possible sources of supply such as substantial
rainwater storage for water needs where a lower quality is sufficient, water efficient appliances and local handling of waste water and runoff water to return water to the natural system.

5.1.4 A more holistic approach would be to improve aquifer recharge, though changed land-use in main recharge areas. Further investigation is needed into the capacity to “farm water” especially under changing climate conditions, by providing incentive for farmers in certain areas to help recharge aquifers by managing their land in certain ways. The role of the water companies in such a process, and potential links with other public benefits—biodiversity and landscape gains from required works etc—merits further investigation. EU project proposals to examine the design of such systems in the Mediterranean are under development at this moment (Scholer, 2005).

5.2 What are the likely future trends in water demand, and what can be done to manage demand more effectively, and to influence the behaviour of consumers and others? And what contribution can science, engineering and technology make towards reducing water use or waste by households, businesses and the public sector?

5.2.1 Agricultural businesses are planning how to respond to a more market orientated economic climate after the recent CAP reform, the introduction of Single Farm Payment, and increased exposure to global market forces. This has resulted in reduced incomes in the arable sector. On suitable soils, eg lighter sandy soils, this is leading to increased specialisation and focus on higher return crops such as potatoes, and vegetables. These crops increasingly rely on access to irrigation to ensure maximum return through continuity of yield, quality, and supply. Such changes are likely to increase demand for water in agriculture in the future, and land without this facility will have fewer viable production options. Moreover, future renewals of abstraction licences will require growers to demonstrate responsible and sustainable use as part of Catchment management.

5.2.2 There are well developed techniques for determining crop requirements and optimum irrigation practice. There is an ongoing need for research and adoption of advanced technology to improve efficiency of predicting crop requirements, increase in efficiency of application, and identify best practice to minimise impact of irrigation on soil erosion and diffuse pollution of water courses.

5.2.3 The large specialist growers typically have operations in other countries to provide year round continuity, (eg, Southern Europe, North and East Africa, Americas, and Eastern Europe). These will have their own water supply issues which will also be influenced by the demands of the UK supply chain, but may also influence UK interests and water use.

5.2.4 The market and environmental pressures on growers to maximise their efficiency in water use together with the likely impacts of climate change on farm businesses has resulted in significant interest in water resource funding opportunities. The England Rural Development Programme (ERDP) offers funding opportunities for water resources and supports activities which reduce summer abstraction in favour of winter abstraction, increase efficiencies, demonstrate environmental benefits and use up to date technologies (eg to reduce pump power requirements, operate leak detection systems, measure and manage the irrigation demand of crops).

5.2.5 The relatively high cost of investment in winter storage means farmers will continue to seek support in this area beyond the current England Rural Development Programme. An interesting example is the approach that has been used to reduce predominantly agricultural abstraction on the River Till SSSI (part of the Tweed catchment). Close cooperation between abstractors and regulators revealed that the need for water for irrigation is focused around potato-tuber setting. An analysis of historic flow data revealed the probability of available water during this six-week time window and has enabled the abstractors to secure their need through dedicated solutions such as use of groundwater and winter storage of river water.

5.2.6 It is clear that the demand will increase in other sectors also. This will have a strong spatial component and is controlled by housing and business development as well as climate change. Domestic usage can be managed through a combination of improved and dedicated building regulations, driving the uptake of water saving in new build and providing financial incentives for changed use in existing homes. A potentially powerful demand management tool is water price for the customer. Increased recognition of the true cost of water is required, combined with differential costs for essential and non-essential uses. Addressing water issues through community engagement can be an important means of increasing environmental awareness, sense of responsibility and pride and ownership when achieving good results.
6. CONTEXT

6.1 The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at national and European levels, adequate?

6.1.1 Although the Water Act promotes sustainable water use and water conservation, there remain practical hurdles to the implementation of this on the ground in a number of circumstances. The problems around the “adoption” of SUDS are a particular example, where the regulatory framework could streamline and facilitate the local implementation. Another example is the lack of a strong drive to include water saving techniques within new build. The inherent higher construction costs are minimal in comparison to the total building cost and should not be an impediment to the inclusion of water saving techniques in new small and large-scale building.

6.1.2 Financial incentives such as tax relief for efficient water usage (eg efficient irrigation) and a dual pricing strategy could also be considered. Lack of finance within many farm businesses to secure winter storage without grant assistance, or to adopt designs which also incorporate environmental benefits alongside water storage (eg range of depths, shallow edges and wetland habitats) can be a constraint. Also limiting at present, is a fear of investing in new winter storage infrastructure when there is a perceived risk of reduction or revocation of licence resulting from the review of Environment Agency consents affecting Natura 2000 sites.

6.2 How does water figure in the development of Government policy in areas such as housing, land use planning and industry?

6.2.1 In commenting on the South East Regional Development Plan (A Clear Vision for the South East, 2005), English Nature drew attention to the concept of “Environmental Infrastructure”. This is now at the forefront of thinking and has been recognised as a vital component of sustainable communities. English Nature, Countryside Agency (Landscape, Access and Recreation) and Environment Agency have agreed a definition for what Environmental Infrastructure should be, based on the need to manage natural resources to continue to meet future societal needs. Whilst the value of the wetland environment is acknowledged, the impact of future water demands is not sufficiently addressed. Even under current levels of resource use some sites such as the River Itchen SAC and River Test SSSI are suffering deterioration, and further pressure as a result of development will exacerbate this situation. Wider recognition is needed of the resource needs of water and wetland sites in such strategic planning.

October 2005

Examination of Witnesses

Witnesses: DR ALASTAIR BURN, Head of Water and Wetlands, and DR JOHAN SCHUTTEN, Senior Hydro-Ecologist, English Nature, examined.

Q410 Chairman: Perhaps I could welcome Dr Burn and Dr Schutten, who helped us at the seminar some weeks ago. It is good to see you again and thank you for the help you gave us on that occasion. I would remind our witnesses and the members of the public that there is an information sheet available by the door and I hope it does accurately record that I am a pensioner of English Nature, having chaired the JNCC some years ago, and indeed I am a member of the NFU which will be relevant to the second focusing on water management.

Dr Burn: Thank you, my Lord Chairman. My name is Alastair Burn and I manage the Water and Wetlands Work Programme as a whole for English Nature and manage our water and wetlands team which comprises about nine individuals. I should just say by way of introduction that the evidence we have put together was on behalf of the Natural England partnership, so we took on board comments from our Countryside Agency and RDS colleagues.

Dr Schutten: I am Johan Schutten and I am English Nature’s senior hydro-ecologist. I deal mainly with all water management issues and water resource-related issues on the political and policy side of English Nature, so I am part of Dr Burn’s team, focusing on water management.

Q411 Chairman: Thank you very much. If there is nothing further you want to say by way of introduction, shall we go straight into the questions that we have in mind. Perhaps I could start off by asking you to describe English Nature’s involvement with water management issues and perhaps you could elaborate on how you interact with the
Environment Agency and the other regulators and to what extent all this is likely to change with the formation of Natural England.

Dr Burn: I will summarise our engagement on water management issues. Essentially we engage in terms of our core activities through our duties in relation to the Countryside Rights of Way Act and in relation to our responsibilities under the Birds and Habitats Directives. We provide policy advice to government on a range of issues, including those related to water management and we carry out, commission and collaborate on research to underpin those areas. To elaborate just a little bit, Chairman, in relation to that, as far as our Rights of Way Acts duties are concerned, one area relates to our consenting activities in relation to operations likely to damage SSSIs where they might have implications for water abstraction issues, and we can perhaps give you some examples of that later if that would be helpful. We engage particularly with the Environment Agency, but also with local planning authorities in relation to planning inquiries and consenting activities where water management issues might impact on SSSIs, on Natura 2000 sites and so on. Specifically in relation to our work with the Environment Agency, we work very closely with them in probably three main areas which are worth stressing, I think. One is in achieving what is necessary for the protection of Natura 2000 sites. We work closely with the Environment Agency on a number of technical advisory groups and one of those relates to water management and we jointly work with them to help determine the nature of response that is needed, the nature of the impact response relationship between the sites and the habitats and species that we are interested in and the water resource implications there, so one area is in relation to the Environment Agency’s review of its consents under the Habitats Directive. Similarly, we are working closely with the EA under a programme to identify the remedies needed to achieve the PSA target for SSSIs and included in that is work to achieve water level and water resource requirements of SSSIs. The third area is on both a technical and policy line where we work with the Agency very closely on the Water Framework Directive both in terms of looking at the overall policy requirements and objectives of the Directive and looking at ways of implementation through the various components of that, but also again on technical task teams which are responsible for developing standards, including those related to water resources. I probably should say a little bit about the corresponding responsibilities of our Natural England partners. Clearly RDS has a major role in relation to probably three main areas which overlap with the water resources end of things. One is advice to landowners under the England Rural Development Programme and particularly in relation to things like agri-environment schemes which might include the creation and restoration of freshwater habitats. The second is through the Rural Development Scheme, including initiatives to encourage rural businesses to take a more sustainable approach to the use of water, although this area of work is going to transfer to the RDAs in due course. The third is in managing the Farm Advisory Programme for Defra policy divisions. In all those areas we and the RDS are collaborating more and more closely as we move towards Natural England and probably one of the major areas of joint collaborative work is in the recently announced Catchment-Sensitive Farming Programme where Defra have set aside £25 million over two years to implement catchment-sensitive measures across around about 40 priority catchments. Finally, the Countryside Agency has probably rather less involvement on this specific area, but it is working with the Environment Agency on its duties, the Environment Agency’s duties that is, in relation to landscape, access and recreation and there are some aspects relating to water availability and particularly the landscape aspects of water bodies that are relevant there.

Q412 Chairman: Could you just explain what happens when, in monitoring a habitat under the Habitats Directive, you determine that there is over-abstraction by the water industry or a farmer? Do you then specifically advise the Environment Agency that there should be a reduction or a revocation of a licence or is that left to some other process?

Dr Burn: There are probably two separate things we have to look at here. One is that the Agency is currently reviewing all of its existing abstraction licences as part of its Review Consents Programme under the Habitats Regulations, and the second is the interaction we have with the Agency over, say, a new or proposed activity, both governed in relation to Natura 2000 sites; (SACs, Special Areas of Conservation, and SPAs, Special Protection Areas for birds). In both of those cases, we would work closely with the Agency to identify both the chain, if you like, or the link between the abstracting agent or proposed abstraction and the potential impact on the species and habitats that we are concerned with and then we would seek to apply the criteria for the protection of those particular types of habitats either through the consents review process or independently, if it is a site-specific issue relating to new abstraction, again through the process for dealing with new consents.

Dr Schutten: If I can add to that, as my colleague has already said, what we will do is we will define together with the Environment Agency what criteria and what needs there are for the water-dependent ecosystems, what kind of water supply they need in terms of quantity and quality and it becomes then a matter for
Q413 **Lord Oxburgh:** This question really follows on from the kind of things you have just been discussing. In your paper you essentially advocate a precautionary approach to water abstraction, but what does this mean in practical terms for water companies and for farmers?

**Dr Schutten:** I think there is a reason why we advise, advertise and promote a precautionary approach. Several of you have been to the opening seminar, what I tried to make very clear was that there are reasons for the precautionary approach and one of them is the quite often irreversible effect, or very-difficult-to-reverse effect, of an abstraction on an ecosystem where, if you were to draw the water table down for too long, you get chemical processes happening within the peat layers which start degrading the peat. You then get nutrients being released which are locked into the peat at this moment in time and you get a lowering of the surface water level and, therefore, as the surface lowers, it increases the nutrients concentration, so it becomes very difficult, if not impossible, to return that ecosystem to the desired state. Therefore, there is a reason there, a reason of ecological integrity as to why you do not want to go to that end point and why you do not want to get to a situation where damage is visible on the ground because at that moment in time, it becomes very, very difficult, if not impossible, to return it to the desired state. That is one of the reasons why we advise the precautionary approach.

Q414 **Lord Oxburgh:** But what does the precautionary approach actually mean when it comes to doing things or not doing things? Does it mean that a provisional licence would be given and you would be there on the ground regularly looking for changes? What does it actually mean?

**Dr Schutten:** The precautionary approach for us would mean that we would look and we would apply criteria which are generic criteria where we would stop and intervene and we would advise the Environment Agency to intervene on further reductions based on criteria before it actually happened on the ground, so before the damage on the ground is visible, and it can be that, because of a whole range of reasons, the ecosystem has not collapsed yet, but it is on the brink of collapsing and it is hanging there by its fingernails.

Q415 **Lord Oxburgh:** All of these things are possible, but they are not necessarily the case. You say that actually the understanding of these systems is rather poor, so does this not make it quite difficult for you to make those judgments?

**Dr Schutten:** That is a hostage to fortune and you are managing and issuing licences and we advise on the ecological requirements of the habitats. The Committee suspended from 3.52pm to 4.03pm for a division in the House

Q416 **Lord Oxburgh:** I will not repeat the original question, but let us take it a little bit further because you are having, I think you said, to make recommendations on the basis of rather incomplete scientific understanding of the situation and I guess what I was going on to ask was whether there are circumstances under which you might support a provisional licence to extract when you actually monitored the situation, and I do not mean simply by standing at the surface periodically and looking at it, but making more sophisticated measurements of what is happening at depth so that you have got a better understanding of what was reasonable and what was not in a particular situation?

**Dr Schutten:** If I can respond to that, I think one of the reasons why I have started outlining why we are precautionary is because it is directly linked in with whether we can have a monitor-and-see-what-happens kind of approach. The Birds and Habitats Directive requirements are one of the reasons why the Environment Agency, in the implementation of its whole Review Consents process, requires that we should be able to ascertain the effect on the integrity of a Natura 2000 site. If there is a doubt that we can determine no adverse effect, based on the balance of probabilities, there are very clear reasons under the directive that action should be taken to ensure no adverse effect on the integrity at the end of the assessment. Therefore, if we want to see what happens and come back in five years and get our best understanding, do all the measurements on the surface and at depth in terms of ecology and in terms of hydrology, that would not normally be the way forward and would not normally be the way we would advise things. However, our judgement is all based on the risk-based approach, so if there is a very low risk to a particular site either because the ecosystem is quite resilient and quite robust to changes in water supply or because the linkage between the abstractor’s activity and the changes of the hydrological parameters within the systems are...
minimal and are likely to be not very great, then there would be scope for things like that.

Q417 Lord Oxburgh: But if you do not understand the science, you do not know what is a reasonable risk.

Dr Schutten: I think that is taking the way that I was portraying the reason and the rationale for wanting more science a bit too far and further than I would have liked to. I think there is a lot of evidence and we have got quite a lot of evidence not only within this country, but also in Continental Europe where there has been developing science. If we take, for example, the criteria for river flows, they are not being plucked out of a hat, but they are based upon the research assessment methodology which is enshrined within the CAMS (Catchment Abstraction Management Strategies), but there is a bulk of scientific information, ecological information that links ecology and the functioning of rivers to hydrological parameters. What I was asking for and what I was trying to push for within the presentation that we made and within the evidence that we have given, is that there needs to be a further level of analysis and a further level of understanding and more detailed understanding and an incorporation of, for example, all the outcomes of the asset management plan studies and all the Reviews of Consents where we have site-specific studies, river-specific studies, ecosystem-specific studies. The only way we can look at how that works on a much more global and a much more holistic level across the country is not by looking at any particular site, but looking at how that works on a much greater scale and that is what needs to be done.

Q418 Lord Oxburgh: But when you talk of these studies, are you talking of looking at a dynamic situation, for example, in which abstraction is going on so that you are continuous in looking at the consequences of abstraction, for example, or is it simply an examination of the status quo?

Dr Schutten: There is a range of these studies. Some of these environmental studies that we are pushing and which we have been using a lot at this moment in time are the Wetland Framework projects where we have been working together with the Environment Agency and Countryside Council for Wales. Here we have been looking countrywide at the whole range of sites where a certain vegetation community occurs, so that we can understand what the hydrology, the hydrogeology and what the water supply mechanism is, what actually feeds into a site, so we are using a much more conceptual approach to it. That is one side to it, how we understand how these sites function and, therefore, what water is needed and, by looking at observations at this moment in time and looking at the ecology which is there on the surface at a moment in time, you can derive what is the right level or what is a reasonable level of water to have within these systems, so that is one reason for doing it.

Chairman: I think we are going to be asking more about the research programmes, so let's move on to that and find out what is needed.

Q419 Baroness Sharp of Guildford: The issue really is one of research and you have called in your evidence for a major research programme looking at both ecosystem functioning and practical thresholds for the water resource needs of ecosystems. Who do you think should be co-ordinating and undertaking this research and would additional funding be required for it?

Dr Schutten: We advise, we ask for and we would support major research because we do not think that that holistic level of analysis and that further pulling of all the knowledge together to form a conceptual understanding rather than on an individual basis has been done. But who needs to do that and is additional funding required? One of the reasons why we would like this research to be done is to enable the linking of the behaviour and the needs of the ecosystems to the behaviour and the temporal needs at the time of the abstractors and I would like to illustrate that with an example if I can, my Lord Chairman. If you take, for example, the agricultural community on the Till catchment, on the border rivers, we are working together with the farmers and we have identified that the critical period for water when the farmers really needed their water was not all year round, it was not during the bulking-up, although it was during the bulking-up that water was needed, but that was not when it was critical. It is critical to have the water for scab control during the tuber-setting period of potatoes and if you then link that period when that water is needed and the quantities are needed for irrigation with what the ecosystem needs, you can come up with much more targeted holistic solutions. Therefore, going back to your question of who would fund this and who would steer this, it is sitting on the overlap and on the merger between, for example, bodies like the research councils, like NERC, but also EPSRC because it covers the solution base, but it needs an ecological understanding also.

Q420 Baroness Sharp of Guildford: Do you put any funding in? Do you fund any joint projects with NERC?

Dr Schutten: We have got a very small research budget within Natural England. We do quite specific research on particular topics and, for example, for this we have been looking at bringing together all the knowledge that is available at this moment in time in Europe and worldwide for a whole range of habitats. That is the limit of what we can do and you are
talking about £10,000, £20,000 or £30,000 worth, not about the big-scale stuff. We are working together with the Environment Agency on slightly larger programmes, but here I am talking about much more in-depth and much more integrated research proposals where you would have to work together with research councils and not just one research council.

Q421 Baroness Sharp of Guildford: So it is a matter really of stimulating the research councils to undertake this piece of research?

Dr Schutten: Absolutely, stimulating the research councils to work on a joint basis, but also having the opportunity for us as a user of that research to influence where that research is going.

Baroness Sharp of Guildford: Do you think that there is enough money currently within the research council budgets to fund this sort of research?

Q422 Chairman: Before you answer that, perhaps you can just note that the CEH is about to have a massive cut of, I think, 40 per cent. That is the Centre for Ecology and Hydrology. Therefore, against that background, is it likely that the research councils are going to be funding the sort of work that you are now suggesting?

Dr Schutten: My Lord Chairman, that was exactly the point that I was going to bring to the table, that there is a 30–40 per cent reduction in grant to the CEH, which is one of the major governmental bodies which holds and accumulates and brings all that information together, so, against that backdrop, I do not see that the research councils at this moment in time would have the funding. They might have got the overall budget, but I do not think they have allocated it in such a way as some would envisage.

Q423 Lord Whitty: We have got a PSA target for SSSIs, more or less all SSSIs, and we have got a more or less absolute requirement on Natura 2000 sites. Can you describe how you go about meeting those targets?

Dr Burn: Yes, as you say, the PSA target for 95 per cent of SSSIs to be in favourable or recovering condition by 2010 applies across the piece, so we cannot take out the water and wetland area from it. The 95 per cent target has to include that whole habitat tranche as well. We have got a range of responsibilities and roles to help achieve that. Firstly, we have got our own SSSI estate, we have got our own National Nature Reserves, about 8 per cent of the SSSIs are National Nature Reserves, and we have to ensure that our management is compatible with water resource requirements there. We occasionally take action in relation, for example, to managing surface waters on a given site, but, by and large, on NNRs and within other SSSIs it is going to be other regulators that will have to deal with this and it is not often the case that we can do the management totally in house. Mostly we will be operating through our conservation advice to other public bodies and that will be particularly the Environment Agency in relation to abstraction issues, but also, in relation to water management, the Internal Drainage Boards (IDBs), of course, and through the work we have done with the Agency particularly for bodies like Ofwat in helping to develop the programme for water abstraction under the last periodic review. So there is a raft of policy-related activities and site-specific-related activities with various regulators. As my colleague has mentioned though, we also deal on occasions directly with SSSI managers in relation to water abstraction issues and I think the example of the River Till is an interesting one, because it is one where we currently have responsibility for the consenting activities for the abstraction going on there and we were able to enter into direct discussions and arrangements with the owner/occupiers in that case to come up with an outcome that met our long-term conservation objectives for the site, but also met their medium- and long-term needs in relation to carrying on their own activities. As Dr Schutten explained, the breakthrough there effectively was having the capacity to identify precisely what the problem was from the users’ perspective, ie, a narrow window when there was an absolutely pre-eminent demand for water and then being able to relate that to the current state of knowledge of the sensitivity of that particular habitat to water depletion at that particular time. It comes back to the question about research and it shows the interaction between two types of understanding which have to take place, but it also shows the level of detail that you would need to go into to get some site-specific solutions in many cases over and above the straightforward application of generic targets. I hope that has helped you with the answer to the question; it is managing our own estate, dealing with owner/occupiers directly, dealing with the regulators both on a site-specific basis through the Remedies Programme, for example, in the case of the Environment Agency tackling the SSSI PSA target and on a policy basis, for example, through the Ofwat discussions to determine the overall objectives under AMP4.

Q424 Lord Whitty: Given that you and the other regulators engaged in this are really operating a management system for those resources, how far do the various interventions in Europe help in that in terms of the Habitats Directive, the Birds Directives and now the Water Framework Directive? Do they help or hinder or do they set out objectives which we will find cut across the kind of objectives you are setting out in terms of the management of the sites?
Dr Burn: I think the short answer is that, as far as English Nature and our objectives for biodiversity are concerned, then all those Directives either do, or should, help. There is no doubt about that in our minds. The Habitats Directive and the Birds Directives, for example, place specific duties on us and other competent authorities to achieve certain things by certain deadlines and that is extraordinarily helpful as a driver. They provide a different dimension to things, it is true to say, so that they will require specific objectives relating to the features that are important at a European level as opposed to just a national level, so it might mean that on an SSSI we have to operate, as it were, a kind of twin-track thought process, dealing both with the conservation requirements under the Birds Directives and the Habitats Directive as well as with the requirements for anything else that we have to designate sites for. However, in the main it is a synergistic approach and there is no doubt that the very precautionary way in which the Habitats Directive is applied through the Habitats Regulations and the requirement to demonstrate no adverse effect on integrity is an extremely powerful and important element in helping to achieve what we need to achieve for biodiversity on those sites. The Water Framework Directive of course deals explicitly with the protected areas, including the Habitats and Birds Directives as a component of the Water Framework Directive, so in a sense it is a kind of sub-compartment of that. Over and above that, I think there are two things I would like to say there. One is that, operated effectively, the Water Framework Directive provides the pre-eminent mechanism to tackle things at the catchment-wide level and enables us, with the Agency, to deal not in a piecemeal way with what Natura 2000 sites need, but with SSSIs and with the links that might be required there with Biodiversity Action Plan requirements, so it offers the opportunity for a much more holistic approach, if implemented properly. Where we still have some way to go, I think, is in the way in which the Water Framework Directive will actually be applied in relation to SSSI targets, and we may come on to talk about how we need to marry up the requirements to achieve good status of the Water Framework Directive and favourable condition on SSSIs and there is still some work needed there. In the main all those Directives are moving things in the same way, they are providing a forum for the sort of technical discussions which need to take place and provide some very powerful legislation to achieve what is required.

Q425 Lord Mitchell: What do you understand by “good” ecological status in the context of the Water Framework Directive and what will need to be done to meet this standard in England and Wales? Also, if I can add a couple of other points on that, what is your position on the proposed Priority Substances Directive and do you think that the environmental benefits of eradicating the 11 hazardous substances will justify the cost and the increase in energy use? Dr Burn: I will start off with the first part of that perhaps and then ask Dr Schutten to take over and then I will come back on priority substances and hazardous substances, if I may. Good ecological status, the conditions under which that will be identified within England and Wales, will be determined by the Environment Agency. We are engaged with them in helping to develop appropriate targets, but at the end of the day it will be an Environment Agency-led decision. As I mentioned before, it is still, I think, not quite clear what the link would need to be between good ecological status under the Water Framework Directive and favourable conservation status or condition for SSSIs and Natura 2000s. The sorts of thresholds and standards that are being talked about and developed now do show a lot of overlap between the sort of work that we are doing with the EA for SSSIs and Natura 2000 sites and the wider work for the Water Framework Directive, but bringing those two together is still something that has not really been finalised. It seems likely, I think, that in a number of instances SSSIs and Natura 2000 sites, being the sort of “cream” of the water environment, are going to be more at the “good/high” boundary under the Water Framework Directive rather than the “good/moderate” boundary, so the sorts of standards that we have been talking about, if you like, at the more precautionary end are likely to lie at that upper end rather than at the “good/moderate” end. That will not be invariably the case, because there may well be some water bodies under the Water Framework Directive which do not have SSSI status or where the wetland feature is not part of the reason for SSSI designation, but in the main I would see it working that way. I do not know, Johan, if there is anything you want to add.

Dr Schutten: I do not think there is anything in particular I can add at the moment to that.

Dr Burn: You asked a question about priority substances and hazardous substances and whether it is worth the energy costs. We have not got a full position on that. As far as priority substances are concerned, I think our view would be that it remains important here, as with other areas, to take a risk-based approach and that particularly in relation to SSSI protection and Natura 2000 site protection, there will be a number of polluting substances which will fall under priority substances where we see existing problems which need to be dealt with and I think we would approach the problem through that. For example, therefore, we have got good examples of problems relating to sheep dip and SSSI water
courses where we would want to take a stronger approach than we currently are able. In relation to the overall sweep of dealing with hazardous substances and the balance between dealing with that and energy costs, I think again the important principle to keep in mind is to identify what the environmental hazards are, but also environmental risks, and a lot of the effort has gone on currently in relation to hazard rather than risk and I think, from our perspective, a move to a more risk-based approach which takes into account more strongly exposure routes and exposure to the environment would be an important part of that.

Q426 Lord Taverne: Yorkshire Water told us that the minimum safety levels were set so low that they are not based on a scientific criterion at all and that in fact compliance with these very low levels would have the effect of increasing their output of greenhouse gases threefold which seems absolutely ludicrous. Have you had similar representation from other water companies and what do you feel about Yorkshire’s view?

Dr Burn: I think there are two things on that. We would not be the relevant regulatory or statutory body dealing in the main with those standards which, I think, are based on human health criteria, if you are talking about drinking water standards here.

Chairman: Yes. Perhaps you could come back to us on that.

Q427 Lord Taverne: Yes.

Dr Burn: So it is not really part of our overall remit. Probably this is one we should take away and provide further written evidence to you on that.

Chairman: Yes, perhaps you could come back to us on that.

Q428 Baroness Platt of Writtle: How do you factor in climate change when calculating the water resource needs of freshwater ecosystems and will the effects of climate change necessitate ongoing abstraction restriction in an ever-increasing number of sites?

Dr Schutten: What we are doing is we are looking at the effects or the relationships, and the criteria that we set are based on the linkages between, for example, the whole flow pattern and the whole flow profile within rivers, which includes drought and low-flow conditions and it includes high-flow conditions. If you translate that to what is happening under the climate change scenarios with higher and increased downpours in the winter and a drier situation in the summer, it therefore means that two parts of that hydrograph will be affected. In that way, we do not change the criteria, but we are taking into consideration what effects climate change will have upon the whole flow regime of rivers. Similarly, that is what we are doing on wetland ecosystems where we are looking at the normal range of the year criteria for low levels which we think are not conducive or where crossing those criteria would not be conducive with the long-term integrity of these systems. But we also would recognise and realise and set different criteria, and we are working together with the Environment Agency on those, for drought situations where the system is under an ecological stress. We have, however, to remember as well that drought is a natural phenomenon and a drought would occur naturally in the ecosystems, so a drought as well is very important, as I said in my presentation to you during the opening seminar, in steering major changes within ecosystems, so it is an important phenomenon. What we actually do not want is the frequency of those drought situations, the duration of those drought situations and the depth of them increasing due to human causes. So therefore, yes, we are looking at it and we are using it in setting up our criteria, but within the current abstraction management that the Environment Agency is setting with the current licensing system, it is so short-term at this moment in time, the six to 12 years of the licences, that therefore we are not using climate change predictions within the criteria we are setting and within the outcomes of, for example, the Review Consents process.

Q429 Baroness Platt of Writtle: At what point do you accept that the character of a particular site has irreversibly changed because you have just said is a bit ‘on the one hand and on the other hand’ and it might work out in different ways?

Dr Schutten: Absolutely. There will be such situations and if some of the climatic prediction scenarios are true, then we will be faced in 50 or 80 years’ time with situations where the base flow in the chalk rivers in the south of the country will be lower and, therefore, at least some of the ecological function of these systems might not be able to be maintained anymore and that is a situation that we have got to accept.

Q430 Lord Taverne: How far ahead do you plan in this great area of uncertainty?

Dr Burn: I guess the nub of it is that we are attempting to determine what the underpinning ecological requirements are for a particular habitat or species type and that includes the mean requirements for water availability and the effect of any intermittent changes that might take place through intermittent drought, through length of drought and so on. Effectively we are planning there for the expectation, if you like, that that site or that habitat type will require that kind of water level

1 In fact, Yorkshire Water told the Committee that the Dangerous Substances Directive, if implemented, would cause and increase in their greenhouse gas emissions of around two-thirds. The increase resulting from the Priority Substances Directive would be of the same order.
indefinitely. What we need now to do, and what English Nature has started to develop, is to look much more at what the longer-term adaptation requirements might be under climate change. At the moment, coming back to perhaps some of the points that were raised by Lord Whitty, effectively the designation system draws a line around the site, whether it is an SSSI or a Natura 2000 site, and the regulations and Directives and requirements on us are to maintain that in the condition suitable for that habitat type. Under climate change it is likely that there will be changes. We know that already in terms of things like sea level rise and implications for freshwater sites at the coast where the site just may not exist anymore, but there are also these more subtle changes in terms of availability of water and the effect of pollutants and so on. Therefore, what we are looking at now in English Nature is almost a paradigm shift, I think you could call it, in the way in which sites might be protected or habitats and species might be protected in the future. So we are looking at ways in which we could link up more effectively between different sites, facilitate migration of species and shifts in habitats. That will require in due course a change in the way that conservation objectives are currently recognised. I think this is one area which is going to be particularly exciting and interesting as we move into Natural England and we will start to link up some of the more landscape-wide initiatives with site protection. Therefore, there is not a straight answer as to how far ahead you plan, and all we can say is that currently we have sets of objectives based on best available knowledge for what those habitats are likely to require. We know there will be changes which we can do little about in the long term and we need to manage for some optimum scenario in the future, allowing shifts to take place.

Q431 Lord Taverne: What can we do to encourage farmers to grow the most appropriate crops for their part of the country in terms of water use and to maximise use of water-efficient irrigation techniques, and could this possibly be something that could be paid for under the CAP?

dr Burn: Again this may be one that we will need to reflect on with our colleagues in RDS to give you a more substantive answer. From our perspective, I think the idea that there should be perhaps some sort of ongoing payments for systems that are known to be damaging, the idea that that should go on indefinitely, I think, is a difficult one, so we would need to look at an approach which both identified what the overall end points are that we want to achieve and set up a map towards getting there. Having said that, there are certainly opportunities through things like cross-compliance requirements, through some of the current agri-environment, and certain some of the potential agri-environment, programme to assist with the sort of changes that might need to take place. In terms of water abstraction, I guess our best experience of this so far has been the sort of experience we have had in dealing with the potato irrigation scenario on the River Till where it has proved possible in that case not to change production, but to accommodate ongoing production and to help with water resource planning so that both our requirements and the farmers’ requirements are met.

Q432 Chairman: But you are aware that there are some quite large potato units, for example, in Norfolk where they will maintain the crop soil moisture deficits at certain levels by spraying every day. Some of the written evidence we have had from abstraction interests says that if they are to move away from these systems, they will want 100 per cent grants, in other words, the costs to be fully funded for winter reservoir catchment. Does that make sense to you?

dr Burn: Well, my Lord Chairman, we are talking here about damage to designated sites which is our main concern and the idea that there should be some ongoing payment to enable that to take place does not sound like it is the right interpretation of, if you like, a polluter pays approach, but some creative use of CAP funds, Single Farm Payment and that side of things as a kind of phased approach to tackling this over the longer term should be something we and others should think about.

dr Schutten: What we, for example, have done on the Till and what we are doing more and more and where I see great opportunities for Natural England is by working together with the farming community through advice to farmers and understanding what their irrigation requirements are, understanding what their needs are and how that links in with the ecological needs and, therefore, coming up with a sustainable solution. For example, what we have done in the Till catchment is help the farmers there to set up their farmer abstraction group so that there is one voice that can attract and bring in scientific advice for the farmers of what kind of water do they need, when and where, and then working together with them, and at this moment in time we are also helping them to find alternative sources of water through that. That is also through Defra grants and there are also grants to train people and to assist them in finding the right sources of water. What in the end there might not be is the funding to fund a full installation of a reservoir through the compensation payments if licences have got to be revoked, but that is a whole different kettle of fish and I am not sure if you want to go into that.
10 January 2006  Dr Alastair Burn and Dr Johan Schutten

Q433 Chairman: Well, I am sure we will be discussing that with those who follow you and we are now running out of time and we must allow time for our other witnesses, so thank you very much, Dr Burn and Dr Schutten, for helping us today. You did kindly say that you would write to us on the Priority Substances Directive and perhaps one or two other matters which you may wish to think about further. Thank you again for your help.

Dr Schutten: Thank you for inviting us.

Supplementary memorandum by English Nature

1. In Response to the Question:

Why do you advocate a precautionary approach to water abstraction?

Ecological Water Resource Targets

1. English Nature’s responsibility in this matter

1.1 English Nature’s role in the protection of the water-dependent environment from water resource pressures, is delivered primarily through our advice to regulatory authorities, and especially the Environment Agency, on the ecological requirements of Natura 2000 sites and Sites of Special Scientific Interest (SSSI). Our advice on conservation objectives for designated sites and requirements for their protection, especially in terms of their water quality and water resource requirements, informs the Environment Agency in the decisions it makes through its own consenting regime.

1.2 In the case of water resource requirements, the Environment Agency then applies these hydro-ecological requirements through the water management framework that interacts with particular sites. Less frequently, English Nature has a role in directly authorising such activities through the consenting of activities carried out by owners or occupiers of SSSI (for example on the River Till SSSI, which, as part of the Tweed catchment, is an exempt area for Environment Agency abstraction licensing).

2. What are we protecting?

2.1 Wetlands, lakes and rivers are by definition critically dependent upon the supply of the right quality and quantity of water throughout the year (Mitch and Gosselink, 1993, Hughes and Heathwaite, 1995). Sites designated on the basis of national and international legislation represent the most valuable examples of wetlands, lakes and river habitats and so require the strongest possible protection. These sites often lie within a seriously impacted and non-functional hydrological catchment, and therefore need good hydrological protection to continue to exist and flourish. Such action is required specifically to further the conservation and enhancement of SSSIs under the Countryside and Rights of Way (CRoW) Act, and to avoid the deterioration and disturbance of Natura 2000 sites under the Habitats Directive.

2.2 Fen and bog communities in general are sensitive to changes of water level and quality, because the community structure of the characteristic plant communities (which also provides the necessary habitat for the animal communities) is driven by their ability to thrive in generally nutrient-poor water-logged, but not flooded, conditions for a considerable part of the year. In drier conditions other plants such as trees and shrubs take over, and in wetter conditions swamp communities (eg rush pasture and reed-bed) dominate.

2.3 Rivers need sufficient running water so that: (a) the morphological processes that maintain the necessary dynamic sediment conditions remain (erosion/deposition, gravel cleaning etc); and (b) the water is refreshed frequently, enabling the physico-chemical conditions to remain fairly constant and provide a more optimal habitat (more highly oxygenated and lower temperature conditions, and well-flushed to prevent build up of nutrients) for the characteristic animal and plant communities than would more slowly moving water.

2.4 There are often complex interactions between water availability and the ecological functioning of a wetland ecosystem. For example, abstraction pressures, such as reductions in aquifer pressure, can reduce the supply of calcareous groundwater to a base-rich vegetation community that is surrounded by soils containing more neutral to acidic waters, thereby reducing the capacity of the base-loving plants to compete (Wheeler, B D et al 2002). Anthropogenic reductions in flow in a salmon-supporting river can increase siltation and thus kill the eggs of the salmon in the river-bed gravels (eg Milner, N J et al, 1981).
3. Drivers for hydro-ecological targets for nature conservation

The nature of English Nature’s advice to the Environment Agency and other bodies on the water resource requirements for habitats and species protected under national and international legislation, is based upon both the legal provisions for designated site protection and the best current scientific understanding of the ecological requirements for freshwater habitats and species.

3.1 Legal Framework

3.1.1 The principles set out in the Rio Declaration

The Rio Declaration (at the 1992 United Nations Conference on Environment and Development) states: “In order to protect the environment, the precautionary principle shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”.

3.1.2 The Habitats Directive, implemented through the Conservation (Natural Habitats, &c) Regulations 1994, requires a clearly precautionary approach to be adopted. The Directive requires that prior to the granting of a licence for a plan or project, or the affirmation that the licensed activity may continue, a conclusion that it will not have an adverse effect on the integrity of the European site (known as Natura 2000 site) and its features, must be reached (unless there are imperative reasons of overriding public interest why it should proceed).

3.1.3 Article 6.2 of the Habitats Directive requires that Member States shall “take appropriate steps to avoid, in special areas of conservation, the deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas have been designated”. Article 6.3 allows the carrying out or permitting of a plan or project by a competent authority (subject to there being no alternatives and imperative reasons of overriding public interest why it should proceed) “only after having ascertained that it will not adversely affect the integrity of the site concerned . . .”. This is clearly a precautionary test. The ECJ has interpreted this as meaning that competent authorities may only allow a project to proceed “if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects” (C-127/02, paragraph 61). Therefore if reasonable and scientific doubts remain, (in the absence of alternatives and overriding public interest (OPI)) the project cannot proceed.

3.1.4 Recent cases within the European courts, (for example the Dutch Cockle fisheries: C-127/02, paragraph 61) clearly indicate that the absence of scientific proof of damage is a not reason to take no action. However it is also clear that the precautionary approach under the Directive must be applied on the basis of reasonably foreseeable risk. Advice provided must be reasonable and based upon information attributing foreseeable risk of a causal effect. For example, with regard to evidence being “lacking”, then this evidence must have been looked for and related hypotheses need to have been clearly tested as far as reasonably possible within an appropriate assessment. Steps to prevent the risks materialising then need to be put into place as necessary within a legally enforceable framework. This approach is highlighted by the Lord Nimmo Smith judgement of the Cairngorms railway case2 which concluded: “I do not accept that this means that there must be an absolute guarantee that the integrity of the site will not be adversely affected. There can never be an absolute guarantee about what will happen in the future, and the most that can be expected of . . . a competent authority . . . is to identify the potential risks so far as they may be reasonably foreseeable in light of such information as can reasonably be obtained, and to put in place a legally enforceable framework with a view to preventing these risks from materialising”.

3.2 Ecological requirements

3.2.1 In relation to the prevention of damage to Natura 2000 sites from water abstraction, English Nature’s advice is based on the current understanding of the ecological requirements of the species and habitats involved. There is ample evidence (Hobbs, R J, 2002) of non-linear ecological change with increased environmental disturbance: a small increase in a pressure, such as a drop in water table or reduced flow in a river, can push the ecosystem to an undesired state. This non-linear ecosystem behaviour often includes hysteresis, where the magnitude or pattern of ecological change that occurs as a result of increasing key hydro-geological and hydrological pressures is not the same as the magnitude of change (and hence extent of

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2 WWF UK and the RSPB - v - Scottish Natural Heritage, the Secretary of State Scotland, the Highland Council, Highland and Islands Enterprise, and the Cairngorm Chairlift Company. Opinion of Lord Nimmo-Smith, 27 October 1998, Outer House Court of Session Edinburgh, Protection of European Sites at Cairngorm Mountain.
ecosystem recovery possible) that occurs with a reduction of those pressures (e.g. Frelich, L E and P B Reich. 1998). There is a growing body of practical experience to demonstrate the particular sensitivity of wetland ecosystems to such effects (see examples below). This means that restoration of a wetland or river damaged by abstraction is difficult and hampered by negative ecological feedback mechanisms.

3.2.2 Our own practical experience has clearly indicated that the recovery or rehabilitation of wetlands damaged by disturbance to the hydrological regime, is not necessarily achieved simply by returning to the right hydrological conditions. In the case of East Ruston fen SSSI, for example, damage (nutrient release and surface level lowering as a result of peat breakdown) to the soils during a period of lowered water tables (as a result of water abstraction) has severely constrained restoration efforts. Similarly, the lowering of the water table (due to aquifer abstraction) in Redgrave and Lopham fen SSSI caused the peat soil to dry and subsequently oxidise, whilst releasing stored nutrient and changing the chemical status of ions such as Iron in the process. When the water table was restored, the peat surface had lowered, the nutrient levels within the peat top layers had increased, and the up-welling water transported the oxidised iron as ochre to the surface. The result is a severe delay in recovery and in certain cases a complete inability to return to the pre-impacted fen community.

3.3 Conservation criteria

The UK-wide agreed criteria that are consistent with the favourable condition of a protected habitat are embedded in the JNCC (Joint Nature Conservation Committee) Common Standards for Monitoring (http://www.jncc.gov.uk/page-2217). These standards include not only biological criteria for species and habitats (e.g. community types typical for particular habitats), but also include chemical and physical parameters that provide the environmental framework in which the protected habitat or species thrives. The basis for the hydrological targets under the latter criteria are further elaborated below.

Hydro-ecological targets

3.4 Wetlands

3.4.1 A five-year field survey by leading UK wetland scientists, (including Prof B Wheeler (Sheffield University), Dr D J Gowing (Open University) and Dr O Mountford (Centre for Ecology and Hydrology)), combined with experimental studies on particular habitats and species (Gowing et al., 1998 a, b, and c) has provided the evidence base to derive a limited number of conceptually distinct types of water supply to wetland ecosystems. The water level and nutrient observations carried out during the survey, combined with additional experimental evidence, were subsequently used to derive generic water quantity and quality requirements for the distinct wetlands (A Wetland Framework for Impact Assessment at Statutory Sites in Eastern England (Wheeler and Shaw, 2000) and ecohydrological guidelines (Wheeler et al., 2004)) for lowland wetland plant communities (Environment Agency: http://publications.environment-agency.gov.uk/pdf/GEAN0305BIPZ-e-e.pdf). There is agreement with the Environment Agency for these criteria to be used in impact assessment and management, and modified to portray local conditions where robust more site specific evidence is available.

3.4.2 Whilst site specific information can be used to modify more generic hydro-ecological habitat criteria, there are limitations in the degree to which such additional studies can support decision-making. Such site-specific investigations are always conducted within a potentially affected ecosystem and therefore must be compared with similar habitats under a range of impacted and non-impacted situations (i.e. the approach follows the rationale adopted in the Wetlands Framework research). Site specific investigations need also to consider all potential water quantity-mediated impacts, which should include interactions such as any hydrological contributions to water quality effects (e.g. alkaline versus acidic and nutrient-rich versus nutrient-poor conditions) on ecosystem integrity. Finally, it is nearly impossible to perform dose-response type experiments because of the high level of complexity of ecological relationships within the protected habitat and the strong inter-relationship with the wider chemical, physical and biological environment at various spatial and temporal scales.
3.5 Rivers

3.5.1 Most hydroecologists judge rivers with natural geomorphology and naturally large fluctuations in flows (i.e., “flashy” rivers) to be more susceptible to variations in flow regime than regulated rivers with naturally high baseflows. The focus of most concern to date has been on abstraction stress during the natural annual low-flow period (late summer/early autumn), but there is increasing recognition that ecological risks are significant across all parts of the flow regime, depending on the level of abstraction stress operating. This situation has led English Nature to couch flow targets in terms of deviations from the naturalised flows occurring in the river in question, which vary according to river type.

3.5.2 Extensive discussions with the Environment Agency have focused on the adequacy of their Resource Assessment Framework (RAM, part of the Catchment Abstraction Management Strategy, CAMS) for determining acceptable levels of abstraction stress on designated (SSSI/SAC (Special Areas of Conservation)) rivers. The RAM framework sets generic levels of abstraction stress judged by an expert panel to be generally acceptable for different types of river, based on characteristic hydrology/morphology and available information—judgements are based on a range of available data and aim to provide basic protection of the river ecosystem.

3.5.3 After considering the specific requirements of designated sites legislation in the determination of impacts on site integrity, adjustments to threshold levels of abstraction stress within the RAM framework were agreed with the Environment Agency for use on SAC rivers. It was further agreed that these generic targets could be over-ridden by local hydrological targets where these were generated by robust, site-specific and comprehensive hydroecological information.

3.5.4 In parallel, the Centre for Ecology and Hydrology was commissioned to compare the approach English Nature is taking to setting hydrological targets for designated rivers with other approaches internationally (Acreman et al., 2005). The report concluded that the approach outlined above was appropriate given the requirements of designated sites legislation and the current level of uncertainty in determining the effects of abstraction on river systems.

4. In summary, the precautionary approach taken in respect of determining water resource requirements for designated sites is underpinned by the body of evidence outlined above, which defines the level of risk to the functioning of the water dependent site. Ecological theory and practical knowledge in restoring damaged ecosystems underlines the threat of serious or irreversible damage. The process of investigations such as those under the Review of Consents programme, where English Nature provides advice to the Environment Agency, clearly equates to the formulation and testing of relevant hypotheses under such an approach, and enables refinement of judgement based on local investigations.

5. Additional comment on English Nature’s role in discussions on Priority Substances, and the Article 16 daughter directive to the Water Framework Directive

5.1 English Nature is represented on the Chemistry Task Team, which reports to the UK Technical Advisory Group for the Water Framework Directive. The work of that Task Team includes consideration of the Priority Substances list, and its implications for operational delivery in the UK. English Nature’s engagement is primarily to provide a view on the consistency of any action with the approaches we are advocating in relation to the regulation of toxic substances, in water and in sediments, under the Environment Agency’s Review of Consents under the Habitats Directive. Through this process we have had some involvement in the process for applying Environmental Quality Standards (EQSs) for toxic substances, which will determine the scale of action required.

5.2 Our approach on Priority List toxic substances, as for other hazardous or toxic substances, is to base our criteria for protection of designated sites, and on wildlife more generally, on an assessment of risk to designated features or vulnerability of species potentially at risk. So, for example, we would look for stronger controls over those substances (such as pyrethroids used in sheep dip) which pose particular risks to freshwater conservation, and we are currently engaged in joint work with the Environment Agency to determine risks to Natura 2000 sites from endocrine disrupting chemicals.

February 2006
Memorandum by the National Farmers’ Union

The National Farmers’ Union represents the interests of some 55,000 businesses which are engaged in a diverse range of agricultural, horticultural and related activities throughout England and Wales.

The NFU places water management at the forefront of an environmental agenda for agriculture and horticulture that is growing in both scope and importance. The availability, access and storage of water are critical to modern farming businesses. The need for adequate and consistent water supplies extends well beyond the farm boundary, as these businesses play a fundamental role in the local, regional and national economy either as a direct employer or as the support for a number of upstream and downstream industries.

The NFU has promoted the importance of water efficiency to the industry through initiatives such as Water Wise in Autumn 2000 and by sponsoring the agricultural/horticultural sector in the Environment Agency Water Efficiency Awards.

Defining the Problem

What are the causes of the current problems of water supply, and how serious are they?

The answer to this question will depend on whom you ask and what region of the country you are referring to. Historically, the water availability agenda has focused primarily on summer shortage issues but the severity of the problem will vary regionally. Many will argue that farmers use too much water at the wrong time of the year, but the principal causes of water supply problems are insufficient awareness and education about efficiency in water use in all domestic and industry usage, and the need to protect existing supplies.

At present, problems of water availability are not deemed to be serious. For example, restrictions on irrigation in agricultural use are both rare and limited in extent. However, this is no reason to be complacent. The availability of water resources is vital for farming production and the industry is becoming increasingly aware of the need to be prepared for a time when resources are scarce, including through the use of winter storage.

What are the projections for future water supply, and what factors will influence these projections?

The NFU does not have independent projections of future water supply. However, seasonal differences in water availability are going to become increasingly obvious as a result of the drier summers and wetter winters, which are predicted with climate change. Potential increases in extreme storms may also result in higher volumes of water falling during individual events, but it is not clear whether this could become extra “available” water.

Water plays a crucial role in modern farming. Within the industry the continuing availability of and access to water have major implications, particularly on the quality of produce and competitiveness. However, agriculture accounts for less than 2 per cent of water abstracted in the UK. Future environmental policy, combined with the potential effects of climate change is likely to draw greater attention to the conflicting demands on current water use by all sectors.

There is growing concern from the Government, industries and Non-Governmental Organisation of the need to address the increasing pressures placed on water resources, whilst maintaining environmental protection. Achieving sustainable development will be contingent upon a clear strategy for both managing demand and augmenting supply, which is agreed between all stakeholders.

Where, and over what timescales, may problems emerge?

Some parts of the country, such as East Anglia, are already considered “dry” areas. In these regions it is anticipated that conditions will be exacerbated by climate change, hence the timescales over which water resource problems are manifest locally could be relatively short. Notwithstanding this, current water resource management does not seem to have a strategy for capturing water for use in dry periods.

Serious problems may emerge within the next 10 years as housing development and habitat creation put additional pressures on limited resources. For example, in East Anglia, the Office of the Deputy Prime Minister has plans for major housing development despite water resources already being fully utilised. It is not clear where the extra water resource required to service the population increase would come from, particularly as there are no plans to build public reservoirs in the region and Ofwat will not accept the cost on behalf of water company customers.
10 January 2006

Is the response of Government, the EU, regulators and the industry adequate?

The water industry and the Environment Agency have responded well through the Asset Management Programme (AMP). However, some water companies still have a poor record on pipe leakage and the Environment Agency’s key function is increasingly that of protecting the environment rather than developing water supply. More water is lost through poorly maintained mains pipes than is used in irrigated agriculture.

The EU will have a major influence through the implementation of the Water Framework Directive, but the focus will very much be on water available for the environment. The government has issued strategies but has not yet given a clear lead on how additional water resources will be found to meet extra demands, nor on how it could be funded.

Farmers have responded proactively to the problem through the establishment of abstractor groups, set-up to specifically address local water resource issues. The NFU have encouraged this process by facilitating the formation of new groups and through sustained support for existing ones.

Supply and Demand

What are the options for increasing water supply, and what are the arguments for and against?

Before increasing water supply, efforts first need to be targeted towards improving efficiency in the use of water supplies across all regions. Greater emphasis should be placed on the use of reservoirs for capturing ample rainfall for use in dry periods, or on investigating the capacity to adopt larger scale initiatives, such as the bulk transfer of water to areas of scarcity. For example, in the East of England water could be moved via the Trent, and through the building of new canals. Both offer strategic solutions that reduce the risk of drought, but are high cost options. Further research is required to investigate the potential for desalination of seawater and storage in aquifers.

From a farming perspective, it is hoped that government proposals on water rights trading will promote more efficient water use. The NFU encourages its members to undertake a water audit on farm and the practice is widely adopted. We will continue to promote water efficiency measures to all members. However, we are conscious that more could be done.

Winter storage reservoirs provide an excellent opportunity to minimise the impacts of abstraction. However, the process for the construction of winter storage reservoirs is highly involved and unnecessarily expensive. At present, it is possible to get a funding contribution through various grants, but the existing application system for aid is complicated and involves large amounts of resources and time. Winter storage reservoirs could be better promoted and incentivised through the use of grant aid, tax relief or by removing the costs of capital expenditure.

In addition to water conservancy, reservoirs have the potential to fulfil multiple environmental benefits. For example, there may be scope to improve reservoir design to incorporate wetlands, to provide flood retention storage, or to act as filter ponds for run-off. With current uncertainty about what the future holds for the industry, it is not difficult to understand why abstractors are reluctant to invest in them. Greater opportunities could be provided for growers to collaborate on shared reservoirs and for farmers to improve their infrastructure by installing pipework, which connects different drainage or irrigation systems.

What are the likely future trends in water demand, and what can be done to manage demand more effectively, and to influence the behaviour of consumers?

Demand for water for both domestic and industrial uses is likely to increase. This is primarily due to the fact that, with the exception of metered domestic supplies, the cost of water is not linked to its usage. Universal metering of domestic supplies may threaten more vulnerable sectors of society, but a rebate system could be introduced where necessary. A range of water efficiency measures could be incorporated into building regulations, it is highly unlikely that they will be taken up voluntarily. For example, legislation could insist on more water efficient household fittings, including mandatory duel flushing toilets and showers to be fitted in all new homes.

The greatest gains are to be made through continued education of the public, rather than just at times of stress.
What contribution can science, engineering and technology make towards reducing water use or waste by households, businesses and the public sector?

In relation to farming, there is a pressing need for the practical application of new technologies on farm and demonstration to farmers of methods that make the most of the water available to them. This latter could be achieved in cooperation with the levy bodies and research institutes.

Research is also needed on how drainage systems could make “grey water” available for some uses. For example, East Anglia is a dry region but also a region at risk of flooding. Urban drainage systems could be adapted so that floodwater could be used elsewhere, for example, to water gardens.

**Infrastructure**

What is the current state of the water supply and drainage infrastructure? Is there sufficient investment in its improvement?

Water company pipe leakage is a serious issue which puts pressure on the whole system. Urgent investment is needed to curtail the loss of significant volumes of water in this manner. Similarly, many urban drainage systems need updating. Rural drainage systems have been well maintained in Internal Drainage Board areas through landowners’ financial contributions. However, in rural areas communities are becoming increasingly concerned about the decline in Environment Agency budgets for the routine maintenance of existing flood defense structures.

**Context**

The Water Act 2003 amended previous Acts in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at national and European levels, adequate?

The Water Act has revised and updated previous legislation to take account of the principles of sustainable development in relation to water management and licensing. The Water Act will restrict licences by setting time limits, assigning liability for environmental damage to the abstractor and generating compensation from the fees of other abstractors. Many of its provisions have not as yet been introduced in practice. However, national and international legislation to promote sustainability is now very strong.

The Habitats Regulations require water abstraction licences in areas where there are designated special areas of conservation to be reviewed, in order to investigate whether they are having a damaging effect on the environment. The Environment Agency is currently modelling data to assess their effects. Licences are being reviewed between 2004 and 2008, with actions to vary or revoke the licence to be taken between 2006 and 2010.

Catchment Management Abstraction Strategies (CAMS) represent the Environment Agency’s strategy for sustainably managing water resources. Through CAMS, the Agency are assessing the amount of water available in catchments with a view to taking actions where unsustainable practices are identified, i.e. where abstraction is too high compared to the amount of water available. The first cycle of CAMS will be completed in 2007 and they will be reviewed every six years.

Notwithstanding the above, there is a need for greater emphasis on voluntary action and incentives to encourage water efficiency and the promotion of best practice.

How does water figure in the development of Government policy in areas such as housing, land use planning and industry?

Draft regional planning guidance for the East of England recognises the importance of water resource management in terms of planning and development policies. It is less clear whether central government has a clear commitment to providing sustainable water supplies to meet future needs, beyond references to the principles of sustainable development.
What can the UK learn from the experience of other countries?

In New York water companies have subsidised the costs to customers to convert their old style toilets to more water efficient ones; many other countries insist on the use of dual flush systems. In the UK, public awareness on water use is very low. Attention has largely been focused upon recent flood events and not the risks of drought conditions.

October 2005

Examination of Witnesses

Witnesses: Dr Andrew Clark, Head of Policy Services, and Mr Tim Jolly, Water Resources Spokesman, National Farmers’ Union; and Dr Keith Weatherhead and Mr Lindsay Hargreaves, United Kingdom Irrigation Association, examined.

Q434 Chairman: Welcome. Would you like to introduce yourselves? I know you represent the NFU and also the United Kingdom Irrigation Association, but perhaps, Dr Clark, you would like to lead and introduce your colleague and then we will ask Dr Weatherhead to do the same.

Dr Clark: Thank you, my Lord Chairman. I am Andrew Clark and I am the Head of Policy Services at NFU. Policy Services includes the environmental policy functions within our new headquarters building at Stoneleigh, Warwickshire and on my left is Mr Tim Jolly.

Mr Jolly: I am Tim Jolly and I am a farmer from south-west Norfolk. We farm 1,000 acres of mainly irrigated vegetables, supplying potatoes, onions and carrots to our major customers, the supermarkets, and I am also the NFU spokesman on water.

Q435 Chairman: On irrigation?

Mr Jolly: Yes.

Dr Weatherhead: I am Keith Weatherhead, representing the UK Irrigation Association and perhaps I could just say who UKIA are. It is a professional association formed in the 1970s of people who are interested in irrigation in the United Kingdom. Membership goes from farmers and growers through the industry to academics like myself and indeed members of the Environment Agency. It is not a trade association, but a professional organisation. My personal background is that I am an engineer working at Cranfield University, specialising in water resources and climate change impacts.

Mr Hargreaves: My name is Lindsay Hargreaves. I am here as a council member of the UK Irrigation Association. I am a farmer member of that association and my farming interests result in the production of around about 80,000 tonnes a year of fresh vegetables going into the UK food supply chain and making use of very nearly 2,500 megalitres of irrigated water in the process. I am Chairman of my local abstractors group which is the LARK Abstractors which is a members body which aims to work with the Environment Agency in managing water issues at a local catchment level. I am also a stakeholder in the Cam, Ely and Ouse CAMS process, representing agricultural interests.

Q436 Chairman: So, just to get it straight, you are farming, therefore, in the county of—

Mr Hargreaves: Of Suffolk.

Q437 Chairman: With that amount, you could well be farming several counties. I think! Well, I do not know whether either organisation wants to say anything else by way of introduction or would you like to go straight into the questions?

Dr Clark: We are conscious that you have got a lot of questions to ask us, but just as an opening gambit, we very much welcome the opportunity to contribute to your inquiry. Sometimes, mistakenly we believe, agriculture and horticulture are seen as notoriously wasteful of water. We do not believe that. We believe that we have to look after this precious resource, which is absolutely vital to our businesses, with the utmost of care and demonstrate that care and stewardship. The other point I just wanted briefly to make is that, whilst we are going to be focusing here on irrigation and use in terms of crops, I would also like the Committee to be aware that obviously water resources are used in agriculture for livestock and that, in terms of numbers of people using water, is probably more important in terms of numbers, than is used for irrigation: I just wanted to make sure that was minuted.

Q438 Chairman: Do the UKIA want to add anything at this stage?

Dr Weatherhead: Just to say that I think our feelings are similar. We believe that irrigated agriculture is an important part of the rural economy in the UK and that, if properly done, it is a valid, reasonable and efficient use of water. I think our members are increasingly worried that water is going to become less available and more expensive and we will get squeezed between environmental protection and the priority given to the water companies.
Q439 Baroness Perry of Southwark: My question follows on from what Dr Weatherhead has just said very well. To what extent do you feel that the demand for water is increasing in the agricultural sector and how do you see the demand changing in the future? Dr Weatherhead: I am going to draw on research which has been undertaken by my group at Cranfield University variously for Defra and for the Environment Agency. From that, we believe that water use has been growing at about 2 to 3 per cent per annum fairly steadily now for 20 years and it seems to be continuing to go up. The actual amount licensed has levelled off recently because the Agency is refusing to give out some licences, so that has tailed off, but water use, which is less, is still going up. That hides major changes in the crops that are irrigated. A lot of the low-value crops, grass and cereals, have virtually disappeared from irrigation in this country and we are increasingly left with high-value crops, potatoes, vegetables, soft fruit, where the water is going. What we are ending up with now, therefore, is an industry which uses fairly small amounts of water, very small amounts by international standards, on high-value crops and actually produces very high values for water use.

Q440 Baroness Perry of Southwark: Are you quoting known research when you say that we are more efficient in this country than many other countries? Dr Weatherhead: Yes. Because it is a humid climate, we only have to fill in the gaps between the rain, whereas somewhere like Spain is putting perhaps four or five times as much on the same crop.

Q441 Baroness Perry of Southwark: So it is more to do with climate than with practice? Dr Weatherhead: Yes, certainly.

Q442 Baroness Perry of Southwark: How do you think climate change is going to affect farming practices and the demand for water? Dr Weatherhead: Climate change is definitely going to have major impacts in both directions. It may well change which crops the farmers want to grow or indeed what the consumer wants to buy, but putting all of the various factors together, we believe there is probably going to be about a 20 per cent increase in demand even by the 2020s-2030s and 30 per cent by the 2050s, so it is something that will happen fairly shortly. Probably even more important will be the impact that climate change has on water resources. Frankly we do not see the water being there, so it is how we deal with the shortage which will be the big issue.

Mr Hargreaves: A number of the studies have shown us a very interesting window into the future of agricultural demand expanding by somewhere between minus 19 per cent and plus 65 per cent which, as a user, does give us something to go at. I think the fundamentally important point which perhaps has been alluded to is that in agricultural production we are driven by the demands of the marketplace, by the demands of our customers, and the water use on my farm is all about providing my customers with the kind of product that they want. We are servicing what is arguably one of the most sophisticated food markets in the world. It is very demanding in terms of quality, it is demanding in terms of volume, it is demanding in terms of its environmental pedigree, wholesome and safe, and it is very, very demanding in terms of price, so commercial pressures will drive this one in the end. As we look into the future, it is commercial pressures which will determine whether my production continues to increase as I meet my customers’ demands into the future or indeed, if I fail to meet them for whatever reason, whether it is climate change, whether it is change in consumption patterns or whatever, I will become commercially unviable and I will drop out of the frame. Therefore, one can see how it could move either way, but I know it is not very acceptable to give “on the one hand and on the other hand” answers, but I think really one would have to say that the trend of an increase in demand, ignoring changes in regulation, but, left to its own devices, agricultural demand for water is likely to increase.

Q443 Chairman: Are the NFU content with that or do you want to add to it? Dr Clark: Yes.

Q444 Baroness Platt of Writtle: What impact does the CAP subsidy structure have upon the types of crops grown in different areas of the country and, thus, the amount of water needed for irrigation? Dr Clark: I think this is a very interesting question because I think it identifies actually one of the major misunderstandings, and it gives us an opportunity to talk about what has happened with the CAP since 2003. There has been a fundamental change and I think one of the premises of your question, which is that CAP is a driving force for the type of food we produce, the type of crops we grow and where we grow them, is no longer the premise that needs to be regarded as driving agriculture. With the new CAP subsidy structure in place, there is far greater freedom for farmers to respond to the marketplace and to change from one crop to another and I think this is something which we need to take into account, particularly in the Committee’s inquiry into looking at water use. The new CAP structure, whilst it is decoupled from production, is recoupled in terms of land management and particularly in terms of environmental protection; it requires that every
hectare of land has to be farmed in accordance with good agricultural and environmental condition. In many respects this will have, I think, good benefits for water protection, for example, in terms of farmers adopting soil conservation plans and buffering some of the habitats alongside their fields, like hedgerow strips, and alongside watercourses. While CAP is decoupled from production and no longer the driving force of choosing your particular type of crop, there is a recoupling in terms of some of the environmental constraints and conditions on use of that. That is a very important change in terms of how farmers will farm in the future. I do not know whether you want to say anything, Tim, in terms of how you would respond to the new CAP subsidy structure.

Mr Jolly: We do not get involved in CAP subsidies very much because producing vegetables, as we do, cereals, which is mainly to do with CAP subsidies, forms a very small part of our business. We find that the crop production is driven by the marketplace. In other words, the marketplace will decide where the best place in the country is to grow a particular crop. That is based on soils, on climate, availability of water and many, many other things, topography, closeness to markets, et cetera, that decide what is grown where.

Dr Clark: Of course, in terms of an irrigated agriculture and growers particularly, it is also related to your supply chain, local pack sheds and the skills and the resources and the capital that is already on that farm or in that area.

Q445 Baroness Platt of Writtle: I have got a subsidiary question which you may have partly answered in a way, but how can farmers be encouraged to grow the kind of crops that are most appropriate, in water terms, to their part of the country? Could changes to the CAP play a role in this?

Dr Clark: If I could start off and perhaps Lindsay Hargreaves would like to join in afterwards. The introduction of the cross-compliance conditions is something you could look at as one of the ways in which there is some public handle on where crops are grown. The introduction of the Soil Protection Review under cross-compliance conditions, which every farmer has to complete during 2006 and implement during 2007, provides one opportunity to identify the physical constraints in terms of your soil capability to crop land. Particularly, the guidance produced by Defra is quite helpful in this in terms of identifying particular issues for potato, sugar beet, or maize producers so that some of the high risk crops for Water Framework Directive diffuse pollution issues may well be helped in that regard. Lindsay, did you have any other comments?

Mr Hargreaves: I think truthfully, my Lord Chairman, we have covered most of this, the combination of the marketplace and regulation.

Q446 Chairman: I think we have established the CAP is not very relevant to the sort of high value crops that you are irrigating.

Mr Hargreaves: We have spent half a lifetime trying to disconnect public funding from food production, so an about-turn might be welcomed by some.

Q447 Baroness Platt of Writtle: I realise we are in the early days of climate change but you might find that some crops go further north, I suppose, where water is not such a problem—I live in Essex so I have sympathy with you—as it is in our part of the world.

Mr Hargreaves: I think it is highly likely. We can have a good old guess at all sorts of things but we do not know as temperature rises what effect that has on ecosystems further north, so we might find different boundaries are moving away at different speeds. I think the likelihood is you are quite right. We are already seeing a migration of certain crops. I grow maize now for grain and that would have been unthinkable 10 years ago.

Baroness Platt of Writtle: Really. Thank you.

Q448 Lord Mitchell: This question is really addressed to the NFU. What are you doing to improve farming practices with regard to water use, particularly in terms of the loss of water? How effective in improving efficiency are the water audits that you mention in your written evidence? Could I also add that in your evidence you call for better incentives for the construction of winter storage reservoirs on farms. Why should the Government increase the already high levels of subsidy to agriculture?

Dr Clark: There are a number of questions in there. To start with, I just need to make the point in terms of what we in the NFU are doing to improve farming practice. We are a communicating organisation and a representative organisation. We have got limited ability to actually influence the precise nature of farming practice on land. Having said that, we very much recognise that there is a big challenge out there and the need to ensure that water is used responsibly. Moving on to the point about water loss, I think it is important that we challenge the definition here in terms. We do not see agriculture and horticulture as having a particular problem in terms of loss in the transmission of water. We are not losing water in that sense, it is not inefficient from the point of abstraction to the point of application. Where you identify water loss in comparison with public water supply is we do not return water from agricultural crops back into the water cycle, ie it is fully used. In that respect, it is
probably effectively used in terms of the measure being is it used, is it available in the root zone. To summarise: we do not believe we have got a poor record in terms of transmission of water. As to the techniques that we are presently using, the NFU is a communicator, we have got 50,000 farmers in membership and we have got a local group network. We do our utmost through our publications to raise the issue of water use as part of a whole range of environmental challenges that are now facing the farming and horticulture communities. Some of what we do as well is to use people like Tim Jolly to act as local champions for water resources, so instead of me as a policy adviser in the ivory tower, as I used to be in London and now Stoneleigh, pontificating on this, we try to ensure that our members can speak to members. I think that is one of the things that has to happen in the future much more, where we engage our membership to talk effectively and much more meaningfully to other members about ways that they can improve their water efficiency and water effectiveness. Tim, do you want to say a little bit more about that?

Mr Jolly: We made a start with local water groups who came together. I am the Chairman of one of them and Lindsay is a member of another. We came together in times of adversity when water supplies were low, but we have gone on to talk to the EA and to our other local abstractors in our groups about water efficiency, about using water as wisely as we can. We do work very closely with the EA in trying to foster this degree of knowledge out into the community. It works both ways because the EA and English Nature need to understand where are we coming from as farmers and we need to understand where they are coming from as regulators and guardians of the environment. This is very much a two-way process. Through this process we can deliver efficiency in its widest possible terms to irrigation.

Dr Clark: You asked one more question?

Q449 Chairman: About the winter storage reservoir. Are you making a case for further grant aid?

Dr Clark: Yes. We will do that as part of the next version of the England Rural Development Programme. Currently there is limited grant aid through the second pillar of the CAP, the England Rural Development Programme, which is prioritised to a different extent in each one of the regions of England. We will continue to make that case in the next version of the Rural Development Programme because we believe with the context of climate change coming on stream, perhaps more importantly with the application of the new CAP structure and the new flexibility that farmers have in terms of looking at new opportunities, there is a real need to invest in farms, to help them adapt to the new realities of responding to the marketplace and that might be, for some, looking at winter water storage, for others it might be some of the equipment that goes with efficient water use. Hopefully, it is something that not only makes the farm more robust but also ensures that it has a minimal or lower environmental impact.

Q450 Chairman: Do you think it would be reasonable if the taxpayer, either through European Union funds or national funds, were to increase its contribution to winter storage reservoirs but the summer abstraction licences should be limited as a counter?

Dr Clark: I think as a quid pro quo moving from summer use on what is essentially a fairly unreliable supply, and will become an increasingly unreliable source, to a winter water storage or groundwater use, would be a good way forward and I think a sensible investment for the taxpayer because the taxpayer will see a business which is more resilient and better able to respond to the marketplace.

Q451 Lord Whitty: You described the raising of practice to best practice and demonstration projects and so on, but your evidence also refers to new technologies. I was not clear whether those new technologies related to use of water, and therefore agricultural methods, or the storage of water, which you have just touched on, but that is a rather traditional form of storing water, not high technology, or to preventing the polluting effects of agriculture on water supplies. In which of those areas do you see technological advance being possible? Do you see any sign of it to any great degree? What have you been doing with the rest of industry or with the research institutions in order to bring this about?

Dr Clark: We covered this prior to this meeting in terms of the techniques that we believe we can use in terms of improving our use and efficiency of water.

Mr Hargrave: We can take our track record and move it forward. We have done a number of things at a fairly basic level looking at the simple mechanics of how we apply water to land, whether we use rain guns or sprinkler booms and that kind of thing. What we need to be able to do as we look further forward is move at higher levels of technology in order to make sure that we can level out some of the problems that we have now. We need to be looking at improved soil moisture monitoring technology. We have access to certain technologies but not a full and wide range. We need better predictive tools. One of the most difficult things we have to contend with in outdoor farming is the unpredictability of rainfall, so when we are monitoring our soils and trying to maintain very precise soil moisture deficits we can run into trouble if nature gives us more water than we were expecting. We can look for improvements in the control of plant
and equipment, so pumping systems and pressure systems, so that we can move much closer to the edge in terms of reliability and accuracy and that is what we need to be able to do. How we find the funding for this is a new challenge for us. Within the farming industry, within our own businesses, very much the brake on investment is the uncertain financial future that we face.

Mr Weatherhead: If I can just interject there. I think what they mean there is they have to irrigate on the systems, so that we can move much closer to the edge every day but they would not be irrigating in exactly the same place every day, it would be mobile equipment.

Q455 Chairman: They are moving around the farm? Mr Weatherhead: Yes.

Q456 Chairman: Irrespective of rain or anything, they are still irrigating.

Mr Weatherhead: Somewhere, yes.

Mr Jolly: It is not done irrespective of rain. Irrigation scheduling, which is the system we use to determine when and how much rain we need to give to a particular crop, is a fairly exact science and that takes into account all the sunshine hours and wind speed as well as rainfall. To do the water balance equation between what the Almighty sends us and what the crop is using to give you how much to use and when you should use it is how we proceed in this matter. Certainly it is not done independent of what rainfall you get.

The Committee suspended from 5.08 pm to 5.16 pm for a division in the House.

Q457 Chairman: You will remember I was asking Mr Jolly, who had correctly pointed out to me that irrigation did not happen irrespective of the weather, but nevertheless I was making the point that some people need to irrigate even though the conditions may have been improved by rain. My point is this: Mr Jolly, in an earlier intervention you did remind us that all crops are grown where conditions are suitable, where the soil is suitable or the water supply is suitable and where the proximity of the market is appropriate. These are all conditions that Mr Jolly reminded us determine what crops are grown. My point is there were occasions when the Environment Agency, and they gave evidence to us, suggested that their predecessors had sometimes been over-generous in exercising their licences. That is not just for farmers, that is for the water industry as well. Therefore, they find themselves having to reduce the water deficit and they are going to be revoking abstraction licences. Does this seem to the NFU to be a reasonable thing to be doing in the circumstances? If so, what is the impact going to be on the farming community?

Dr Clark: We absolutely understand that there is an environmental envelope in which all farms function. What we want to ensure, however, is that when government agencies identify that environmental envelope farmers are fully engaged in that process so they can understand how the capacity and the availability of water is arrived at. I think in that
I might comment that my own abstractor group, the Lark Abstractor Group, was initiated over problems section 37 that in times of severe drought he may order the cessation of all agricultural abstraction. As we look forward to even further restriction and revocation then of course it is going to have quite an ongoing impact and how we deal with that as abstractors depends on some of the processes that are already in place, the CAMS process and other things. I might comment that my own abstractor group, the Lark Abstractor Group, was initiated over problems following section 57 and cessation clauses where we attempted to work with the Environment Agency to predict this kind of drought problem and adjust our abstraction patterns to be able to manage that difficult period rather than find ourselves simply cut off. If we are going to see a progression of this kind of thing then, of course, it is going to have serious impacts on farming.

Mr Hargreaves: I presume the point really is looking at restrictions and revocations of our abstraction licences. If I can be so bold as to first comment that we might interpret this as a further restriction. Agricultural abstractors are subject to two levels of potential restriction on their activities already, which does not help with planning. One is that many, many irrigation licences are subject to cessation clauses. That means in the case of surface abstraction, for example, if a river flow falls below a certain level we are obliged to cease abstraction. Similarly, in some groundwater licences, if the groundwater falls below a certain resting point at a certain geographical location then that too results in cessation. Those sorts of things do not make planning of farm activities very easy. We also have the problem of section 57 in the Water Resources Act which singles out agricultural abstractions. The minister has the authority under section 37 that in times of severe drought he may order the cessation of all agricultural abstraction. As we look forward to even further restriction and revocation then of course it is going to have quite an ongoing impact and how we deal with that as abstractors depends on some of the processes that are already in place, the CAMS process and other things. I might comment that my own abstractor group, the Lark Abstractor Group, was initiated over problems following section 57 and cessation clauses where we attempted to work with the Environment Agency to predict this kind of drought problem and adjust our abstraction patterns to be able to manage that difficult period rather than find ourselves simply cut off. If we are going to see a progression of this kind of thing then, of course, it is going to have serious impacts on farming.

Chairman: You would nevertheless agree that there should be Environmental Impact Assessments that determine whether these abstractions being exercised are indeed having an adverse environmental impact? Mr Hargreaves: No question about that. As an individual, I am sure any responsible abstractor would not wish to carry on his abstractions knowing that he was having an effect on the environment that was unacceptable. That raises questions of acceptability and who says what, what kind of size is it based on and who is doing it.

Q459 Lord Mitchell: Do these uncertainties not also point to the need for better capture and better storage so that you can smooth over these difficult periods? Mr Hargreaves: They do indeed, yes, of course they do.

Dr Clark: We believe if farmers can come together in catchment groups, share their resources, and there is a simple system by which we can share our access to water between different businesses within a catchment, there is potential there, with a simple system of transfer, for far more effective and efficient use of water within the farming sector. This is particularly important in the South East and East Anglia where there are increasing demands for public water supply and the threat of climate change. It is beholden on us within the farming community to use water responsibly and to be able to hold what we have because for many farm businesses, and the supply trade and food chain beyond that, access to water is essential for the rural economy. If we can have this simple, flexible approach to licence swapping, if you like, or rights swapping, that would be one way which would put real ownership within a farming community to be able to solve some of these problems.

Chairman: Do these uncertainties not also respect it is particularly important that this is based in science and as far away from an art as possible. We need to ensure that there is very, very good evidence for that and that evidence is shared and transparent with all of us. I think Lindsay Hargreaves wanted to come in on this point as well.

Mr Hargreaves: I presume the point really is looking at restrictions and revocations of our abstraction licences. If I can be so bold as to first comment that we might interpret this as a further restriction. Agricultural abstractors are subject to two levels of potential restriction on their activities already, which does not help with planning. One is that many, many irrigation licences are subject to cessation clauses. That means in the case of surface abstraction, for example, if a river flow falls below a certain level we are obliged to cease abstraction. Similarly, in some groundwater licences, if the groundwater falls below a certain resting point at a certain geographical location then that too results in cessation. Those sorts of things do not make planning of farm activities very easy. We also have the problem of section 57 in the Water Resources Act which singles out agricultural abstractions. The minister has the authority under section 37 that in times of severe drought he may order the cessation of all agricultural abstraction. As we look forward to even further restriction and revocation then of course it is going to have quite an ongoing impact and how we deal with that as abstractors depends on some of the processes that are already in place, the CAMS process and other things. I might comment that my own abstractor group, the Lark Abstractor Group, was initiated over problems following section 57 and cessation clauses where we attempted to work with the Environment Agency to predict this kind of drought problem and adjust our abstraction patterns to be able to manage that difficult period rather than find ourselves simply cut off. If we are going to see a progression of this kind of thing then, of course, it is going to have serious impacts on farming.

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Q460 Lord Taverne: Does what Mr Hargreaves said suggest that you see CAMS, the Catchment Abstraction Management Strategies, as a threat or perhaps an opportunity?

Mr Hargreaves: Until we can see more precisely how the CAMS process is going to be rolled out it is difficult to be definitive. I think most farmers and abstractors would like to see the CAMS process as an opportunity. It ought to be a mechanism by which we can share our access to water between different businesses within a catchment, there is potential there, with a simple system of transfer, for far more effective and efficient use of water within the farming sector. This is particularly important in the South East and East Anglia where there are increasing demands for public water supply and the threat of climate change. It is beholden on us within the farming community to use water responsibly and to be able to hold what we have because for many farm businesses, and the supply trade and food chain beyond that, access to water is essential for the rural economy. If we can have this simple, flexible approach to licence swapping, if you like, or rights swapping, that would be one way which would put real ownership within a farming community to be able to solve some of these problems.

Q461 Lord Oxburgh: What are your views on the need expressed in the Water Framework Directive to deal with the pollution of water courses caused by
nitrates, pesticides and other substances from farm runoff?

*Dr Clark:* We recognise the Water Framework Directive as a very serious challenge for the farming community. Not just for the farming community but for many sectors. Many sectors have impacts in terms of water quality. We have all got an ownership problem; the Environment Agency, Natural England, English Nature, farmers and the NFU, to ensure that the principles behind the Water Framework Directive become understood by farmers and other people who potentially can impact on water. Having said that, I think it is also vital that scientists and the ecologists defining what is good ecological status within the Water Framework Directive also recognise that we have got a 21st Century farmed landscape and not a pristine habitat which is unaltered by man. We have been managing the countryside of England for centuries and I think that has had a big impact in terms of water quality.

To answer your question directly as to how do we integrate the soil, water and nutrient aspects alongside irrigation, which I think is probably not such a significant issue in terms of the Water Framework Directive, we need to make sure that there is an integration of both the policy and the delivery. Perhaps Natural England would be one of the ways in which that can happen. I would prefer it that good ecological status would be the consequence of applying good agricultural practice. If we apply good agricultural practice, practice which is economically sound and environmentally responsible, that should result in good ecological status in water courses. That would be what I would aim for and I would hope in terms of management of soil, water and nutrients we can achieve that through an integrated approach taken by government and the agencies. One of the concerns I have is that farmers are being encouraged to have a soil conservation plan, a pesticides management plan, a water audit plan, and there is a danger you are creating a whole lot of plans in a fragmented approach rather than an integrated way.

**Q463 Lord Taverne:** This is a question I put to the water management: evidence. Having said that, I think it is also vital that scientists and the ecologists defining what is good ecological status within the Water Framework Directive also recognise that we have got a 21st Century farmed landscape and not a pristine habitat which is unaltered by man. We have been managing the countryside of England for centuries and I think that has had a big impact in terms of water quality.

To answer your question directly as to how do we integrate the soil, water and nutrient aspects alongside irrigation, which I think is probably not such a significant issue in terms of the Water Framework Directive, we need to make sure that there is an integration of both the policy and the delivery. Perhaps Natural England would be one of the ways in which that can happen. I would prefer it that good ecological status would be the consequence of applying good agricultural practice. If we apply good agricultural practice, practice which is economically sound and environmentally responsible, that should result in good ecological status in water courses. That would be what I would aim for and I would hope in terms of management of soil, water and nutrients we can achieve that through an integrated approach taken by government and the agencies. One of the concerns I have is that farmers are being encouraged to have a soil conservation plan, a pesticides management plan, a water audit plan, and there is a danger you are creating a whole lot of plans in a fragmented approach rather than an integrated way.

**Dr Clark:** It is the same with no-till. The concern is that good ecological status would be the consequence of applying good agricultural practice. If we apply good agricultural practice, practice which is economically sound and environmentally responsible, that should result in good ecological status in water courses. That would be what I would aim for and I would hope in terms of management of soil, water and nutrients we can achieve that through an integrated approach taken by government and the agencies. One of the concerns I have is that farmers are being encouraged to have a soil conservation plan, a pesticides management plan, a water audit plan, and there is a danger you are creating a whole lot of plans in a fragmented approach rather than an integrated way.

**Q462 Lord Oxburgh:** Can this be done without extra cost?

*Dr Clark:* I think the cost of this is something we have to take seriously. All the consultations and estimates on the Water Framework Directive show that potentially the costs of compliance are very significant indeed. That is, however, based on what is as yet not a defined good ecological status quality. If good ecological status is compatible with a modern landscape then perhaps those costs are not as high as some people have assessed. I think the key thing is in 2015 farmers do not want to be in the position of being a long way away from good ecological status and hit with a whole range of regulations which say, “You shall not do this. You shall not do that. You have got to stop using this”. From our point our view, what we want to see is a gradual ramping up of farming practice so that we take on board these environmental constraints in a practical way that both is beneficial to the farm environment and farm economy. What I am concerned about is that by the time we get to 2015 we should not have too big a gap, and that depends on the scientists.

**Q464 Lord Taverne:** Or low-till.

*Dr Clark:* It is the same with no-till. The concern is that good ecological status would be the consequence of applying good agricultural practice. If we apply good agricultural practice, practice which is economically sound and environmentally responsible, that should result in good ecological status in water courses. That would be what I would aim for and I would hope in terms of management of soil, water and nutrients we can achieve that through an integrated approach taken by government and the agencies. One of the concerns I have is that farmers are being encouraged to have a soil conservation plan, a pesticides management plan, a water audit plan, and there is a danger you are creating a whole lot of plans in a fragmented approach rather than an integrated way.

**Q465 Chairman:** Agriculture, rightly or wrongly, quite frequently is blamed for diffuse pollution, whether from the livestock sector or the arable sector, whether from inputs or leaching and the like. Do you think that Defra’s new Catchment Sensitive Farming Initiative is likely to help in reducing diffuse pollution from agriculture?

*Dr Clark:* We are very strong supporters of the Catchment Sensitive Farming approach. This sort of early activity is to help farmers understand what the meaning of the Water Framework Directive is and what is a well-managed environment in terms of water and what that means. The Catchment Sensitive Farming and the type of advice that comes through that is a very good way forward. Yes, it is a beginning. The fact that there is a small amount of
funding available through the advisors, through the project officers in each one of those catchments, is a good thing. We are very much supporting that approach. However, it is probably not the end of the story, we have to look at a whole campaign of activities that should support that Catchment Sensitive Farming Initiative in terms of the application of the Environmental Stewardship Scheme, entry level scheme, and high level scheme to help unlock some of the more costly changes to activity which need to happen, particularly on the livestock side.

Chairman: We have run out of time, indeed we have exceeded our time. That was partly because of the divisions which interfered with your presentation, and I apologise once more for that. Could I thank the NFU and the United Kingdom Irrigation Association for joining us today. If there is anything you would like to add do please write in if you feel there are points we skipped over. Thank you once more for your help.
Q466 Chairman: Good afternoon, Professors, if I can call you that. We are very pleased that you have come to help us today. Would you like to introduce yourselves?

Professor Heathwaite: I am Louise Heathwaite and I am Director of the Centre for Sustainable Water Management at Lancaster University Environment Centre. The other two salient points are that I am Vice President of the International Association of Hydrological Sciences and I am also on the Research Councils' Rural Economy and Land Use Strategic Advisory Committee.

Professor Ellis: Bryan Ellis, Emeritus Professor at Middlesex University, past Director of Science and Training at the Natural Environment Research Council and past Chairman of the Joint International IWA/IHR Urban Drainage Committee.

Professor Morris: My name is Joe Morris and I am Professor of Resource Management and Economics at Cranfield University in the Environmental Partnership and I am Director of the Water and Environment Institute.

Chairman: Thank you very much for that. I would explain to our witnesses and to the public that there is an information sheet available at the door if anyone wishes to refer to that on our terms of reference and our interests. Would any of our witnesses like to make any brief introductory remarks or would you like to launch straight into the questions that we have in mind?

Professor Heathwaite: I am happy for you to launch straight in.

Chairman: Let me start then by asking a question which—and I do suggest that you will not all wish to answer every question, some of you may feel that some of the questions are more appropriately directed at one rather than others—is directed specifically at the agricultural sector. I do not know whether this is something that Professor Morris might feel is more appropriate for him than others but it is up to you. We have noted that in some areas the amount of water that is abstracted for agriculture amounts to, say, no more than three per cent but in other areas it could amount to a very considerable call on the resource. To what extent could current levels of abstraction and water use in agriculture be considered sustainable? How are the true costs, including externalities, factored in when determining if farming is economically viable? Are farmers paying the right amount for their water?

Professor Morris: With respect to abstraction and use for irrigation, it is correct to point out that as a percentage of total abstraction and use, agriculture accounts for a very small proportion, in fact about one to 1.5 per cent overall, but it is often focused in particular parts of the country and is abstracted at times of the year when often water is in relatively short supply and in water deficit areas. In some parts of the eastern counties abstraction for irrigation can be very significant. With respect to your question about sustainability, it depends how you define sustainability, but in terms of the economic aspects then there is quite a lot of evidence to suggest that water is used wisely in agriculture and that irrigation is also of course associated with more intensive agriculture and this is a source of significant employment and value added further down the supply chain, adding significantly in some parts of the country to rural industry associated with food processing and supply. With respect to environment, then again associated with abstraction of water and the fact that irrigation in agriculture is intensive then there is a relatively high environmental burden, both with respect to abstraction in the use of water and also discharges to the water environment associated with that. However, the evidence would suggest that on some of those criteria irrigated agriculture does meet criteria for sustainability although there are questions over its environmental attributes. I think I
would like to emphasise that the evidence suggests from our own work that the value of water in the irrigated agriculture sector in Britain, given that relatively small amounts of water are applied through relatively precise application methods with increasing standards of management, that generally the returns to water are high. The second question relates to how are the true costs, including externalities, factored in when determining if farming is economically viable. Of course, as you will appreciate, farmers pay a price for water which reflects the cost of administering the licensing system. There is not a price for water per se and there is no explicit consideration at the moment of the external costs that might be associated with over-abstraction or perhaps discharges to the water environment. Irrigated agriculture is an example of intensive agriculture and there are estimates available of these external environmental costs associated with intensive agriculture, and although estimates vary, the feeling is they can be quite significant and orders of magnitude have been identified for these.

Chairman: No doubt we can look those up.

Lord Lewis of Newnham: Before I go on could I just ask about the Habitat Directive. How effective do you think this is going to be in influencing abstraction problems?

Professor Morris: The Habitat Directive will give priority to these sites, and that is likely to have implications on access to water where it is deemed that agricultural abstraction could compromise the objectives of that Directive.

Baroness Platt of Writtle: And Suffolk with that sandy soil too?

Professor Morris: Yes, in some cases.

Lord Lewis of Newnham: Do you see any areas that are more sensitive than others as far as this is concerned?

Professor Morris: You mean geographical areas?

Professor Heathwaite: Perhaps I can answer that. In terms of the contribution of agriculture to diffuse pollution, I will answer that primarily in terms of the contribution of agriculture to diffuse pollution.

Chairman: No doubt we can look those up.

Q470 Lord Lewis of Newnham: How much of diffuse pollution arises from farming practice? Why have there been these difficulties in implementing the EU Nitrates Directive? As you are probably aware, there has been now another attack by the Commission on the Defra interpretations which seems to me to bring the whole of this very much into the forefront once again. The whole concept of the Nitrates Directive is very extensive. We are covering 55 per cent of the environmental quality, so rather than including again the concept of the Nitrates Directive?

Q471 Lord Lewis of Newnham: Do you see any areas that are more sensitive than others as far as this is concerned?

Professor Morris: You mean geographical areas?

Professor Heathwaite: Possibly.

Q472 Baroness Platt of Writtle: And Suffolk with that sandy soil too?

Professor Morris: Yes, in some cases.

Q473 Lord Lewis of Newnham: How much of diffuse pollution arises from farming practice? Why have there been these difficulties in implementing the EU Nitrates Directive? As you are probably aware, there has been now another attack by the Commission on the Defra interpretations which seems to me to bring the whole of this very much into the forefront once again. The whole concept of the Nitrates Directive is very extensive. We are covering 55 per cent of farming lands in England if we were indeed to go ahead with that. What are your views on this?

Professor Heathwaite: Perhaps I can answer that. In terms of the contribution of agriculture to diffuse pollution, we will answer that primarily in terms of the two nutrients that are critical—nitrogen and phosphorus. It varies for those two nutrients. The contribution of nitrogen is the larger percentage. Phosphorus, where it is present, can be anything ranging from about 50 per cent up to about 85 per cent of the contribution which could come from agriculture. I say “could” because the issue is how we calculate the proportion from agriculture. Usually that proportion is calculated as a closing term in a nutrient balance, so you basically work out all the point sources and you say the rest must come from agriculture. I think that that is a very poor way of calculating it and a very risky way. There are other issues in terms of the diffuse contributions which might come from septic tanks in rural locations.
which might make up a very significant part of the phosphorus budget particularly, but we just do not know how well those septic tank systems work, how they connect in terms of risk, and how that translates to water quality deterioration. That is the first answer in terms of the contribution. Diffuse pollution could be high, it probably is high, but in terms of understanding all the processes and the different sources I think we still do not have a good handle on the actual size of those contributions. In terms of implementation of the Nitrates Directive, I think that largely comes down to issues to do with management. It seems to me to be very largely to do with how we apply manures—slurry and farmyard manures—to land in terms of the amount that is allowed to be applied. So if you go for 170 kilograms of end nitrogen (N) per hectare as being the acceptable amount then that creates problems in terms of maybe not supplying enough nitrogen for crop uptake but already over-supplying phosphorus. So what you have to do is to think about the two nutrients together, and that is why implementation of the Nitrates Directive is tricky because it also encompasses other issues. It encompasses issues to do with the Water Framework Directive, for example, where I think the EU’s interpretation of how wide-reaching the Nitrates Directive should be is leading it into difficulties of how to interpret nitrogen as an issue in the context of other aspects of the Water Framework Directive, and that is problematic.

Q474 Lord Lewis of Newnham: The suggestion, if I understand it correctly, is that they are suggesting a much more restrictive timing of the year when you can spread manure, which puts the load on farmers to actually store the stuff and, secondly, to increase the buffer zone around water sources, as it were.

Professor Heathwaite: Yes.

Q475 Lord Lewis of Newnham: These seem to me to be rather extreme examples. I am particularly thinking of places like the Lake District where you have a lot of hill farmers and things of this nature. To restrict the access of sheep to the Lakes would be a rather difficult if not impossible task.

Professor Heathwaite: Part of the problem is that it might not provide a solution. If you have a buffer zone and your pathway is largely to groundwater, then having a buffer zone is not necessarily going to stop that nitrate entering the groundwater. If there is a key message here it is that you have got to think about it more holistically. You have got to think about what the implications for the management of nitrogen and other nutrients are, particularly for phosphorus because if you manage nitrogen in one way you might make the problem worse for phosphorus, and then that is going to lead to problems in terms of eutrophication in receiving waters.

Q476 Lord Lewis of Newnham: But phosphorus is a different example. Nitrate is soluble so you can at least get rid of it. The difficulty with phosphorus is that it sits at the bottom and slowly comes up. I am thinking particularly of some of the Broads where they tried in fact to remove eutrophication, and the only way they can do it is by taking away all the sludge from the bottom, which is a phosphorus problem.

Professor Heathwaite: I would argue that you do not need much phosphorus to cause a problem. 15 micrograms per litre is a very small amount of phosphorous. The amount that is bio-available is a small amount but it may be a significant amount to cause eutrophic change in terms of the status of the receiving water. To assume that it does not move is perhaps an over-simplification of the process. The research I have been involved in over the last 10 or 15 years is suggesting that in actual fact it does move and it moves in ways that we are only just beginning to understand such as attached to very small colloids of organic or inorganic particles that can move through macropores in soils, that can then move through to drainage systems and can enter the water course in a way that you would not usually perceive as being a risk. Ten or 15 years ago most of the risk was thought to be from erosion and therefore if we put buffer strips in, we will solve the erosion problem, and we have got a phosphorus solution. In actual fact what you are doing is creating a store of phosphorus for later problems so again, we need to think about the problem holistically.

Q477 Lord Whitty: We talk about the problems of the Nitrates Directive but what is your assessment of the totality of the action that the agricultural sector needs to undertake to fulfil the objectives of the Water Framework Directive? Do you think there is enough work going on either in industry or elsewhere, in government and so on, on this area? Is it realistic really to expect the agricultural sector within the timescale and given the costs that this might imply to meet the objectives of the Water Framework Directive?

Professor Morris: Certainly the requirements of the Water Framework Directive in terms of water quality are going to be much more stringent than the Nitrates Directive and at existing levels of agro-chemical usage in the agricultural sector it is unlikely that those requirements would be met, so therefore without significant changes in catchments that are at risk in terms of input levels, practices, as a consequence there are potentially damaging outputs. So the message at the present time with current uses is that
it is unlikely those could be met easily within the time-frame required.

**Q478 Lord Whitty:** Are the current uses you are referring to uses of fertilisers and pesticides or are they soil management?

**Professor Morris:** All of those things in terms of both inputs and processes where processes would relate to the practices of farming in terms of the timing of operations, the nature of cultivations, the particular land use that increases risk of run-off and contamination, which has implications for the water environment and for the physical and chemical composition and sedimentation in rivers and for the ecological aspects of water quality. So it is all of those things and there is scope, I think, in this to look at ways of controlling risky and vulnerable catchments and to improve practices. I have a view that there is a lot of potential to promote codes of good practice and begin to prescribe in situations where there are perceived risks what are acceptable or not acceptable practices. In my own Institute we have developed, for example, some guidance to farmers on a traffic light system which can look at circumstances and practices, soils, slope, rainfall, predicted rainfall and so on, and give guidance to farmers on when to do things, how to do things given the circumstances that they are in, with a view to complying with improved standards.

**Q479 Lord Taverne:** The water companies on the whole seemed to welcome that Directive, at least those we have spoken to. Do you see it then as something that is going to promote better farming practices or will it inevitably mean a rise in costs?

**Professor Morris:** It may be both actually. Farmers perceive that a constraint on their activities will reduce the profitability of their business because it could constrain outputs or it involves additional costs. I think there are innovative and new ways of addressing some of these problems that can be presented in a way that will be appealing to farmers and will be practical in terms of their operations.

**Professor Heathwaite:** Could I just come back quickly to Lord Whitty’s question about whether we see actually something happening in terms of the Water Framework Directive within the time-frame. I think the big issue that perhaps has not been mentioned is it is not always clear what we are aiming for. This definition of “good ecological status” is a very tricky definition. A lot of the emphasis has been in terms of land management and addressing issues to do with farming, without necessarily looking at the sensitivity of the ecosystem to changes in nutrient status, and that sensitivity will vary for different river basins so we have to have a flexible approach whereby one river basin might respond very positively in a short time to changes in nutrient inputs but another one may not respond at all. It is very difficult to try and interpret that. The Catchment Sensitive Farming Scheme that is out now is a two-year programme and I very much doubt we will see much changing in those two years but we may see some benefits in some catchments.

**Q480 Lord Whitty:** It has been suggested that the costs to British farming because of its good practice models and so on because of the need for change would be greater to achieve the same results as much of the rest of Europe. Would that be your view?

**Professor Heathwaite:** Yes, I think it could be a very high cost in this country particularly.

**Professor Morris:** It depends how you are identifying those costs—costs in terms of constraining agriculture so that revenue from agriculture production is constrained or mitigation costs where it is not constrained in terms of additional cost by industry and so on. Of course however these environmental costs are real and result in a net reduction in social welfare otherwise we would not be talking about them, so these are real costs.

**Q481 Lord Whitty:** It is a question of who bears the costs.

**Professor Morris:** We have to balance the benefits from production of agriculture against the environmental costs and consequences for society. So that is the challenge, is it not?

**Professor Ellis:** It is not my area at all but on the fringe of it what the focus has been so far is on nitrogen and phosphorus. Of course there are major transfers as well from the farmer into surface waters. There is a considerable body of evidence that shows despite upgrading of sewage treatment plans, in Blackpool for instance and the Ribble Estuary, that in fact bacterial flows are still non-compliant in terms of the Bathing Water Directive. These are directly related to flushing from agricultural land use rather than the urban areas and sewage treatment works. So there is a major area there I think that still needs investigation in terms of the sources and the costs attached to those.

**Q482 Chairman:** There will be have to be some scientific rigour, will there not, in determining what is meant by “good ecological status” catchment by catchment? Is it possible to determine a scientific standard which is defensible in court?

**Professor Morris:** The jury is out at the moment in terms of how to define ecological standards. There is some guidance in terms of reference points and the various elements in terms of physical and chemical, hydro-morphological and biological conditions but it is yet to be determined what these standards will be,
and in many agricultural areas we are working with artificial, man-made drainage systems and there is not an easy reference point to determine for those circumstances.

**Chairman:** I think I will take that as a no!

Q483 **Lord Patel:** The question I have is in respect of the reduction or eradication of priority substances. The EU has some expectations in this area; do you think those expectations are reasonable?

**Professor Ellis:** I think it depends on the way that you look at them. I think that it is going to be extremely difficult to eradicate entirely and to reach the levels that are required by the Directive. I certainly think that there are going to be some problems in terms of meeting them as far as the UK is concerned. If you are look at the existing 33 priority substances which have been identified, 11 already have been identified as hazardous as PHS elements and they are going to be phased out over the next 20 years, and a further 14 are going to be announced I believe next year, so 28 out of the existing 33 are already identified for phasing out. Of course there are going to be other emerging substances that are going to come on stream from pharmaceuticals at the same time so there is going to be a substitution of compounds there. I think it is going to be extremely challenging to meet the Directive in that case given that, for example, Defra in their Diffuse Pollution Survey in 2004 estimated that something like 20 per cent of river lengths in England and Wales are at risk due to priority substances and something like six per cent of groundwater is at risk from priority substances, so it is going to be extremely difficult to meet that, I think. At the same time, having said that, I think there is a great deal of play that can be made in terms of control technologies, and in terms of product substitution and product replacement. Just take for example the use of lead weights in tyres, it should be very easy to replace those kinds of materials and substitute for those sorts of areas. Product substitution has got a lot to play in this as well as public campaigns and voluntary initiatives. Driver education for example, congestion control, vehicle design emissions to reduce metals, for example, copper, copper and zinc and various emissions into surface water. So I think it is a mixture of both prevention and protection that needs to be applied here. Having said that, I think it is going to be extremely difficult to meet all the Directives in terms of the priority substances.

Q484 **Lord Patel:** How do you manage this control of diffuse pollution?

**Professor Ellis:** I think it has to be a mixture of both of those. You could argue that prevention measures are effective. If you look at the Oil Care campaign, which has been extremely successful over the last five years, the problem of course is that it has to be revived and resuscitated and reapplied all the time, so therefore, you cannot rely on a single campaign. After the Oil Care campaign was introduced you had fairly good results so there is an impact from those kinds of educational campaigns. You need to firm up inspections and regulation through codes of practice, both non-statutory and statutory codes of practice. For example, we still do not have a COP for car washing. There are whole areas in terms of diffuse pollution sources where we could tighten up the non-statutory approach with codes of practice to address these specific areas at source. So I think it is a combination of both control technologies as well as prevention measures that need to be introduced.

Q485 **Lord Patel:** Are the current methods of analysis capable of detecting to the levels expected?

**Professor Ellis:** I think they are except perhaps for PPCPs (pharmaceutical products) which are different. I think that is a separate area you can look at later on.

Q486 **Lord Taverne:** But are the standards scientifically based because we have had evidence that they are not and that in fact they are just trying to get them down because they can detect lower levels, and the cost of meeting them is going to have very adverse environmental effects because of the extra energy required. We have heard that these standards are nonsense.

**Professor Ellis:** I would not say they are nonsense. They do have a science base and you can justify them within a particular perspective of that scientific approach. The problem, of course, is in terms of how you apply them and the ambit within which they can be reliably and robustly applied.

Q487 **Lord Taverne:** And what about the thesis that in fact in small doses they can be beneficial, there is a j-curve about it, the hormesis effect. It does sound as if this is a case where it is not really driven by the science but unreasonable requirements which are going to be counter-productive.

**Professor Ellis:** I think that is particularly true for PPCPs where you talk about limits at which they are detectable which is between five and 10 nanograms per litre or even less than that. You are at that minimum detectable level so if you look at that sort of level it is going to be extremely difficult over the long term when you look at the continuous, persistent accumulation of those in the sediments of a surface stream to detect the subtle effects of those as opposed to normal change in population that might occur anyway. It is going to be very difficult 20 years on to look back and identify what the specific effects of those ultra trace concentrations might be. I think
it is a different case if you are looking at things like copper and zinc where you can look at the effects of those in terms of the toxicity of the receiving water, but I think where you are working with pollutants which are at that sort of detectable limit at the ultra trace level then there are considerable difficulties.

Q488 Lord Patel: Maybe I should not be asking you this but do we know of the harmful effects to health of these tiny amounts?
Professor Ellis: That is another area of course. If you look at the EU licensing regulations under REACH, I think of the 33 existing priority pollutants, only about half of those have received a full risk assessment, so we do have problems in terms of ensuring that the EU have a better administration and organisation in terms of looking at the risk assessment procedures for these. In many cases we do not know what the human effects of some of these pharmaceuticals are likely to be at the levels at which they are found in the environment. You must remember that of course even assuming 200 or 300 micrograms per litre of discharge that with dilutions of 100 to one in the receiving water then of course the concentrations are back to the detectable limit. If you compare the PEC, the predicted effects concentration, with the predicted no effects concentration they will be always be one or less so the effects are regarded as being negligible. I think there are problems of how you measure the impact of such ultra trace concentrations.

Q489 Baroness Platt of Writtle: What are the problems of dealing with sewage sludge and do you think better use could be made of sewage sludge as a fertiliser, instead of incineration, and what practices would need to be changed?
Professor Heathwaite: I am just coming to the end of a large research project which was funded by the EPSRC looking at the environmental risk of sewage sludge recycling to agricultural land. I think if you put aside some of the social elements of sewage sludge such as faecal aversion and people not really liking the idea of eating crops produced from sewage sludge, let’s put that aside, the best way to think about sewage sludge is just as another type of fertiliser, and in some senses a far more regulated and a far less risky fertiliser than perhaps manure. I know I keep banging on about manure but there are a lot less regulations to do with what is in livestock waste than there are to do with what is in sewage sludge. Without a doubt it is my view that recycling sewage sludge to land is the best practical environmental option. I think the Environment Agency would agree with that. Quite surprisingly a recent campaign of Surfers against Sewage has come out and supported recycling to land as being the best environmental option. If you view it as a fertiliser like any other nutrient input the research we have done shows that it has some beneficial qualities such as a higher organic matter status, such as a lower phosphorus solubility, such as improving other soil physical characteristics that means it is a very good fertiliser. There are problems more with attitude than with sewage sludge per se I would say.

Professor Morris: We have looked at aspects of this with respect to placement to land recently and also coal-firing for incineration and energy recovery. 50 per cent of bio-solids approximately are now put to land as a fertiliser potentially. Farmers have mixed views about it. A key issue is what is it in term of its nutrient values and the balance of nitrogen and phosphorus in particular so predicting its nutrient value is a challenge and then what are the potential contaminants which may be contained within it. That depends on where it has come from particularly if it has got industrial sources, and the extent to which it has been treated.

Q490 Baroness Platt of Writtle: Or medical treatments for animals I suppose?
Professor Morris: Exactly, in terms of hormones and various pharmaceutical products and so on which people are particularly concerned about. One of my post-graduate students interviewed 400 people about their attitudes to placing essentially human effluent to land and people do not like to think about these things. She interviewed them in pubs and outside Tesco and various other places. On the face of it they were reluctant even to think about it and yet it is a social product, if you wish, but it is not something that people want to own and associate with. However, once she presented biosolids in a granulated form that had been treated where it looked more like a conventional fertiliser, then there was greater acceptance. I think there is a major issue here about communicating this product and re-visiting this in terms of whether it is a waste or it is a resource. When we looked at coal-firing, the burning of this material in power stations and in municipal waste stations and also in the cement industry as a fuel, a key issue there was whether there was a financial incentive under the renewable energy credits to facilitate the use of this material, and at the moment there is not, it does not seem to qualify and the system is very sensitive to this. I think we need to look at whether this material is regarded as a waste to be disposed of with no value or whether it is potentially a resource. Our feelings at the present time are that placement to land as a fertiliser is a potentially sustainable outlet. There is good guidance, notwithstanding the comments I made earlier, on best practices. All the various stakeholders engaged in defining best practice, including the
supermarkets, signed up to this. But subsequently the supermarkets have distanced themselves away from it really for reasons of concern about their competitive advantage. In a fiercely competitive sector the supermarkets have distanced themselves from anything that could appear to compromise their position.

Professor Morris: But it costs.
Professor Ellis: At a cost.

Q491 Lord Lewis of Newham: We are back to the point you made and that is whether you call it waste or not. If you use the word “waste” then you have a whole stack of legislation that has to apply to it and has these restrictions to which you have referred. I am not clear about this point but many years ago we were looking at the conditioning of sewage and various thing of this nature, and one of the problems that came up was the appearance of heavy metals. This occurs because large numbers of people when they are disposing particularly of pharmaceuticals or baby creams or things of this nature tend to use the toilet as the natural way of getting rid of these particular things, so there can be very large build-ups of heavy metals in much of your sewage. Surely this can be quite dangerous? Zinc is psychotoxic.

Professor Heathwaite: I think the answer to that is that treatment technologies for sewage sludge have improved remarkably so that if you are talking about advanced treatments then you do not really have the metals issue that we used to have as a problem. I think you can then still go along the line of thinking about it as a resource and not as a waste product because we have that treatment technology now available to mean that the metals issue is more an historical issue than a current issue. However, it still persists just like faecal aversion, as a source of risk and something we should be worried about. I really do not think it is. It is a valuable resource that is going to grow because various Directives such as the Urban Waste Water Treatment Directive are going to give us more sludge to deal with. The sooner we start thinking about it as a resource the better will be our chance to make suitable measurements and managements to apply to that.

Q492 Baroness Perry of Southwark: Is treatment technology capable of eliminating antibiotics? Is that not one of the problems with particularly human waste that we get antibiotics raw, so to speak?
Professor Heathwaite: In terms of treatment technologies.

Q493 Baroness Perry of Southwark: Is the treatment technology capable of eliminating antibiotics?
Professor Ellis: Yes, the tertiary treatment of activated carbon and then membrane filtration can remove 99 per cent or even more of most antibiotics and indeed veterinary drugs.
whether they are or whether they are not in terms of the receiving water ecology. The second major challenge is from what you could call conflicts of priority. One of the major ones here for example is between planning and pollution from those land use activities as a result of planning. For example, there are incompatibilities perhaps between PPG25, which is development and flood control, in that it does not say very much about water quality at all. One of the difficulties and deficiencies of PPG25 is that it does not cover at all the pollution associated with run-off from the urban area. I think that is a particular problem. It is very unfortunate indeed that PPG25 does not cover water pollution, particularly given that from 2006 the ABI are withdrawing their insurance cover from flood-prone properties which are likely to be submerged by that kind of flooding, and of course about a million people are likely to be exposed as a result of that withdrawal of cover. I am sure there will be a considerable political fall-out in terms of the political pressures that come to bear in 2007. I think there is a greater need for much more formal joined-up approaches between various participants in the water management scenario and we will come to that later. The third challenge beyond that is the confusion over responsibilities. If you just take illegal connections, which I have mentioned, the local authorities have the responsibility through environmental health in terms of the impacts for that but they do not have the resources to be able to adequately address them, whereas the EA have inadequate powers to address them, and the water companies say “it is not our problem because essentially that is something happening on private property”, so we have confusion in terms of the responsibilities. That is just one example, there are other examples one can also look at. I think that is another challenge. The confusion over the definition of “sewer”, “right to discharge” “right to connect” in terms of storm water, there is quite a lot of vagueness in terms of those definitions as applied to storm water drains. We need legislative change as well to bring some clarity to that.

Q495 Chairman: We are getting into quite technical drafting of legislation here. If you would like to follow up with a further written note on this we would find it most helpful.
Professor Ellis: I think planning is the most important one. Above all, the one message is that the problem with pollution in urban areas is related to planning more than anything else, but climate change certainly is a major problem particularly in regard to drainage solutions because given wetter winters and higher intensive storms during summer, infiltration practices for example become very difficult to use, so you have to think of other types of solutions, and climate change is another challenge.

Q496 Lord Lewis of Newnham: What about the problem associated with variations in population depending upon the time of year? I am thinking of the South West where, for instance, you get a very, very large influx for a relatively short period of time which must put tremendous demands on the sort of structures you are talking about?
Professor Ellis: That comes back again to the planning legislation because you do have some knowledge of the levels of population that are fluctuating in at different times of the year, so therefore if you have got some scenarios and predictions for that kind of migration then you can plan for that in the future. So it is looking forward in terms of planning guidelines.

Q497 Lord Oxburgh: Foul water and storm water drainage have been separate in the UK for some time, in new developments. Is there scope for making more use of storm water for other purposes?
Professor Ellis: I think personally there is but how far you can go I would have some qualifications over. If you look for example at 1,000 to 2,000 litre rain water tanks, then that could cater for about 40 per cent of the peak daily loads. If you go much higher than that, and I think of Australia where 10,000 litre rainwater tanks have been shown to cater for about 85 per cent of the supply, you can cater for those, whether you use them simply as attenuation tanks to reduce flood risk or alternatively use them for direct usage. From a personal point of view I believe that as far as the UK is concerned the only usage that you might be able use it to compensate for is for irrigation water and possibly for toilet flushing. We are not talking about uncontaminated waters here, and so therefore I think this is about the limit in terms of health that one really might be able to go because of the legal liabilities that would result from insurance beyond that. So I think, yes, you can use it to that particular point but it is very difficult to go beyond that and then you have problems with building regulations, with codes of practice for these sorts of things which would have to be rolled in as well as a back-up to be able to support them. It is not going to replace the existing infrastructure but I think it will be a useful support in these specific areas.

Q498 Lord Lewis of Newnham: Some countries actually treat their storm water and then use it for drinking and put it in the system.
Professor Ellis: Absolutely until something goes wrong and then I think the whole thing will backfire. It only needs one specific episode of ill-health or death that might result from an incident from that
treatment train and I think it will set the whole industry backwards.

Professor Morris: The key issue here is whether this will involve new water. In many cases the water is being retained instead of going somewhere else, recharging ground water, or going into the general system, and I suspect in the majority of cases it is not adding to the totality of water availability. It may reduce costs of recovery and possible unnecessary treatment for some requirements but the evidence across the world often is that these systems do not create new water.

Q499 Lord Lewis of Newnham: That very much depends on rainfall patterns, does it not?
Professor Ellis: That is right.

Q500 Lord Lewis of Newnham: If climate change changes the pattern so one has heavy downpours and most of it runs off rather than infiltration, the picture changes.
Professor Ellis: If you look at south-east England where you are likely under the climate change scenario to have a very high adverse abstraction availability ratio (I think the European Environment Agency has predicted that south-east England is likely to have a 35 per cent greater impact as far as that ratio is concerned than anywhere else in Europe) you might have a much greater advantage of using these systems than other parts of Europe.

Chairman: That indeed is where we have tended to concentrate ourselves the whole time, not least remembering the Office of the Deputy’s Prime Minister’s proposals for the South East.

Q501 Baroness Sharp of Guildford: We have touched on this already but what is the impact of the growing complexity of pharmaceutical and personal care products in households and their disposal. How can this problem best be addressed? I think this is really for Professor Ellis.
Professor Ellis: I have been doing some work over the last three or four years with Thames Water specifically on this issue. Undoubtedly PPCPs are one of the emerging pollutants. Three at the moment are being discussed to be put onto the priority substances list of the EU—diclofenac, ibuprofen and clofibric acid. Those three will be coming next year onto the potential hazard list. If you look at the growth of those PPCPs in the UK they are growing at about three to four per cent per annum and we currently use about 2,000 tonnes per annum of Paracetomol and 4 tonnes of Prozac is used, so inevitably those sorts of levels are going to impose an increasing risk. Of course if you look purely at the end-of-pipe treatment it is certainly true, research would indicate, that activated carbon and membrane filtration in tertiary treatment can remove a large proportion of these, perhaps 99.9 per cent or more, so that in fact end-of-pipe treatment is certainly possible but of course you are talking about very high cost. And given the levels of misconnections which I have already suggested in terms of storm water those are bypassing the system, so there is a background residual level that you always find in all receiving waters, but again, as I have said, it is ultra trace level, five to ten nanograms per litre, you can argue whether that has an impact and, as I think Lord Taverne pointed out, the analytical procedures for these are still in their infancy and it is very difficult to gauge what the toxicity might be.

Chairman: I am going to have to explain to you that depends on rainfall patterns, does it not?
Professor Ellis: That is right.

Q502 Lord Whitty: Can we return to catchments. I assume from what you said earlier that you are in favour of a more integrated approach to catchment management, but what do you see as the institutional and resource problems of achieving that? In terms of the Environment Agency’s approach, are you in favour of the way they are approaching these things or do you have some qualifications to that?
Professor Morris: The emphasis to date has been on water as an element in production and consumption, and there has been a tendency amongst the economists particularly, and perhaps including myself, in terms of pushing it as a commodity rather than taking a broader integrated view of water as part of natural capital and supplying a whole range of services, not only production and consumption, but also regulatory functions, nutrient recycling, carrying habitat functions, which we have referred to, and services to human well-being through landscapes and water space amenity. We have fragmentation in the way that water has been dealt with, with water companies on one aspect and the Environment Agency on selected aspects of these water services. What is required, and to a degree the Water Framework Directive is beginning to promote this, is to bring various stakeholders together representing diverse interests and an institutional framework, including legal aspects and so on, which would
capture this very much more diverse and integrated challenge in the role of water. We see fragmentation in policy, in terms of the way the water industry and other actors are operating, and also in research and funding. That is perhaps something we can come back to later on. Fragmentation is a problem when the challenge, of course, is integrated water resource management often at the catchment level.

Professor Ellis: If I can add on the urban side, as I have said already, I think the major problem is that development at the moment in terms of its approach is a site specific solution because the development approach, in terms of the drainage solutions which are being developed, essentially look at a site rather than at a catchment. There is very little concern when you are looking at the approval for a specific site to the effects on the catchment as a whole. There is a disharmony between the way in which development approvals are reached in terms of water management and the Water Framework Directive. That needs to be resolved. If you look at Scotland, where they have development of FLAG groups, those FLAG liaison groups, at least they can look at a rather more integrated holistic approach. We do need to have a much more joined-up approach which will fit into the Water Framework Directive much more readily than it does at the present.

Professor Heathwaite: I do not think we should underestimate the institutional barriers, the structural barriers and the costs that will be incurred by trying to do this, both within organisations and between organisations. At the moment I am chairing, for the Environment Agency, a CAMS programme for West Cumbria, (Catchment Abstraction Management Strategy) that deal only with water resources and do not view that water resource issue in terms of water quality implications but have to do it all over again when they start looking at the Water Framework Directive. There needs to be some very careful thought about how resources are used and how our different directives are linked together. That is going to be very tricky to do and to also bring it in line with what the water utilities are doing because their cycles of evaluation are different from the cycles of evaluation under the Water Framework Directive, for instance. Without doubt, it has to be done.

Q504 Lord Lewis of Newnham: How happy are you with the criteria being used to measure the quality of things like rivers? It is done normally, is it not, on the length of the river?

Professor Ellis: I think it is, and this has been an outstanding problem that much of the status of rivers is determined by systematic sampling. Of course, you are missing out all of the wet weather conditions because you go at for example, nine o’clock on a Monday morning, therefore you miss all the events which are causing the major problems with the receiving water. It has been well recognised that if you look at the disjunction which occurs between the chemical status of rivers and their biological status, they do not match up. I think that simply reflects that the biology is reflecting the integrated impact, whereas the chemistry is reflecting the impact of the immediate water phase.

Q505 Chairman: Going back to the question about our UK research capacity. You referred to the Centre for Ecology and Hydrology and I take it that you think the cutting edge of research might be more at risk than the long-term monitoring. Long-term monitoring is not exciting science by many people’s standards, but is absolutely critical, particularly in the context of climate, nevertheless, I wonder whether, first of all, we allocate enough priority to this through the research council funding or, indeed, through Government department funding and whether, perhaps, our others witnesses are as sanguine as Professor Heathwaite that these cuts within NERC are not going to affect long-term monitoring?

Professor Ellis: I have a vested interest as my previous hat, as it were, was in NERC. Certainly, it is under-funded in terms that it is responsive funding to be able to react to the research community adequately. The problem to some extent is that we have duplicated funding for some themes which exist, for example, within the Environment Agency and that ought to be funded through the research councils. One of the things that I abhor and it failed to affect, while I was in NERC, was a joining-up of the research approaches which exist within regulatory bodies and other agencies as well, the whole of NGOs within the UK, to provide some integrated holistic focused research from these various bodies. I think that is an area which needs to be looked at; how one can effect the more joined-up funding arrangement
from these different sources to give a more focused research effort.

Professor Morris: I understand that the National Audit Office looked at the monitoring function of the Environment Agency and did ask questions about the efficacy of their monitoring programme in terms of its fitness for purpose at the moment.

Q506 Chairman: I think we have run out of time. Conscious that we have other witnesses to join us in a moment, I must bring this part to a conclusion.

Thank you, Professor Morris, Professor Ellis and Professor Heathwaite, for your help. We found it all very interesting. If there are any matters which you feel on reflection that you would like to write to us about, please do so. We would be very grateful.

Again, thank you.

Supplementary evidence by Professor Bryan Ellis

PRIORITY POLLUTANTS

1.1 The EA/DEFRA 2004 Diffuse Pollution Survey identified 6 per cent of UK groundwaters at risk of Priority Substance (PS) contamination from diffuse sources and some 20 per cent of river lengths at risk from veterinary/hospital medicines.

1.2 The EU Water Framework Directive (WFD) identifies 33 PS of which 11 are classed as Priority Hazardous Substances (PHS) and there are a further 14 possible PS compounds that may become re-classified as PHS. It is intended that all of this PHS group will be phased out over the next 20 years, but there are a list of “emerging” PHS substances including Pharmaceuticals and Personal Care Products (PPCPs), which are also highly likely to join the PHS listing over the intervening time. Therefore, the situation regarding PS is extremely challenging and it will be very difficult to meet the requirements demanded of the Directive within the time scales envisaged. It is highly probable that the UK will fail to meet “good status” for certain substances. It is also clear that the implementation costs of the Article 16 Daughter Directive PS EQS proposals will be significant and the DEFRA response to ECOLAS on this issue stressed the potential economic impact on UK industry even though the qualitative data used was primarily based on indirect costs.

1.3 The WFD recognises that a significant proportion of PS are discharged from urban areas and the EU Source Screening sheets stress the importance of end-of-the-pipe control approaches (activated carbon, membrane filtration etc.) for the treatment and management of PS. There has been considerable upgrading of UK sewage facilities to try to achieve the requisite full tertiary treatment capacity and some £290 million was spent by the water industry under AMP4 to this end. At the same time much greater emphasis needs to be placed on targeting of specific pollutant usage reduction and to some extent this is already happening eg introduction of diuron for atrazine and MTBE for lead. However, it must also be recognised that the replacement substances may present their own particular hazards as is seen by MTBE which is highly mobile, persistent and carcinogenic. The introduction of new control technologies also have their own problems eg the emission of Pt elements following the introduction of catalytic converters.

1.4 There are also considerable opportunities for the introduction of preventative measures as part of WFD Supplementary Measures within the RBMPs. These not only include product replacement and substitution but also improved vehicle emission designs (eg to phase out the use of Zn and Cu in brake linings) as well as traffic congestion control and improved driver behaviour. Public education and awareness campaigns can be highly effective as demonstrated by the Oil Care Campaign. This national campaign intended to enhance voluntary prevention through improved storage of oil and fuels and the promotion of safe disposal for used oil, particularly from vehicle servicing, car jet washing, vehicle wash down etc. The campaign was launched in 1994 and saw a 20 per cent reduction in reported oil incidents during the following two years but the following five years saw very little if any improvement. Such education campaigns require constant revitalisation, with time and resource commitment for the development, implementation and monitoring of the focus group to be continually effective and backed by stricter corporate prevention maintenance and in-house employee training.

1.5 Thus whilst it may not be feasible to incorporate marketing, product and usage controls in the Directive, there is a need for member states to include such approaches within the Supplementary Measures of the Directive. There are also links between PS and PHS reduction requirements to the IPPC and the draft proposals to amend the IPPC directive to reflect these new requirements is very much in a muddle at the moment given the technical difficulties involved. There are also concerns regarding the introduction of any
uniform EU-wide emission limit values (ELVs), for there is little convincing evidence that has been put forward in support of such an approach.

1.6 The 2004 CSTEE report on the setting of EQS for PS was highly critical and pointed out the considerable difficulties in setting viable standards for both sediment and biota as well as with identifying justifiable PNECs. It cannot be appropriate to use large Assessment factors (AFs) when data is lacking and considerable caution is needed here. However, whether this can be changed is open to question as it would open the floodgates to other legislation such as that of the Plant Protection Products (PPP) and there is likely to be very little environmental benefit to be gained. Where there is insufficient data and the toxicity endpoints are not described, it should not lead to the establishment of high EQSs. To ensure transparency, the toxicology of the PS and PHS under consideration needs to be presented in substantial detail with the relevant endpoints for extrapolation being fully justified and uncertainties identified. The majority of PS and PHS within Annex X of Directive 2000/60/EC have yet to be developed in these terms.

Diffuse Urban Pollution

2.1 In Scotland, SEPA identifies urban drainage as the 3rd most important cause of river pollution and 2nd in terms of “most severely affected” waters. The EA has no separate classification category for urban drainage in England and Wales but estimate that between 20 per cent–25 per cent of river lengths are at risk from urban drainage. Given the mid to lower catchment locations of the majority of UK urban conurbations, this represents a very substantial contamination of water volume. It is known for example, that 30 per cent of all oil pollution incidents on the EA Thames Register are directly attributable to impermeable surface runoff and there is a 2002 EA estimate that 50 per cent of oil in the open sea originates from surface water drains. As point discharges have been progressively improved under successive AMP investments, urban diffuse sources have become more prominent as recognised in the DEFRA 2004–05 diffuse pollution review.

2.2 The principal future challenges facing urban drainage in the UK in terms of the WFD requirements are:

(1) Knowledge Gaps: primarily related to the detailed identification and quantification of specific sources, pathway transformations and receiving water impacts (ie associated aquatic toxicological effects). In terms of source apportionment of observed end-of-pipe discharge, how much can be separately attributed to a real atmospheric deposition, local soil inputs, traffic emissions/losses, illegal connections, impermeable surface runoff? In order that regulatory and preventative controls can be targeted cost-effectively, it is imperative that the prime offending sources can be clearly identified. For example, the EA itself estimates that there are between 5 per cent–10 per cent illegal connections on UK surface water systems and this increases to an average of 20 per cent for industrial/commercial premises. Given that it only requires between 2 per cent–3 per cent misconnections to negate any water quality benefits of a separate sewer system, it is clear that targeting this source of diffuse urban pollution could be highly beneficial. However, there are substantial institutional and organisational problems associated with this approach as outlined in (3) below.

For impermeable urban surface discharges, one outstanding issue is concerned with the relative contributions generated by traffic emissions as opposed to direct road abrasion and to the relative contributions of varying types of highway. A third of all UK roads are located within urban areas and the EA estimate that they generate an average material load of 150 kg/km/year or some 20,000 tonnes/annum. But the specific source attribution of this total load is speculative given the various types of roads and traffic densities. It is likely that urban motorways and trunk roads carrying traffic densities in excess of 15,000 ADT are the prime offenders with much lower contributions coming from rural motorways and major roads as well as suburban residential areas. However, there is a need to characterise and quantify these various sources in a more detailed manner in order to target policy and remediation strategies in a cost-effective way.

This information will in any case be needed under Articles 11 and 11.3(h) of the WFD with an appropriate programme of measures identified as required by Annex IV and VII. The RBMPs will need to characterise urban catchments in terms of potential pollutant loading distributions and provide risk assessments in terms of receiving water hazards. The EA have one pilot urban catchment (the Lower Lee in North London) where they are proposing to undertake detailed land use surveys as a basis for predicting and “groundtruthing” pollutant yields. In addition,
DEFRA has commissioned Royal Haskoning to undertake a widely-based literature review to identify data sources relating to urban diffuse pollution sources and impacts.

(2) **Conflicts of Priority:** There are fundamental conflicts that currently exist between planning and pollution control which mitigate against effective control of diffuse urban runoff pollution. PPG3 specifies that new developments should carry increased housing densities of 30–50 dwellings/hectare whilst PPG25 argues for flood risk reduction and for the introduction of source control systems which frequently require increased land take. Not only are these Codes of Practice in conflict but also neither consider the problem of diffuse pollution and receiving water quality. There would seem to be a place for a PPG which specifically focused on the theme of Development and Water Quality as a companion document to PPG25 on Development and Flood Risk. It could also be argued that there might be a place for the introduction of targeted tariffs to support sustainable drainage solutions. The recent ABI flood insurance statement has withdrawn support for PPG25 and their intention to withdraw insurance cover for “flood prone” areas at the end of 2006 will leave over 1M people affected in the UK.

There is a need to focus policy more overtly on prevention and remediation (and public awareness/educational campaigns), rather than on purely regulatory “command and control” measures to meet the requirements of the WFD. At the same time, there is a need to link the mitigating prevention measures to enhanced, more systematic O&M schedules and procedures. Additional statutory and non-statutory CoPs would provide a better balance between hard regulation and pollution prevention and also offer greater specific-case flexibility to EA approaches and site solutions. However, CoPs do need supporting evidence and guidance if they are to be acceptable to industry and the wider general public.

(3) **Confusion over Responsibilities:** Much more formal, joined-up thinking is needed between the EA, water companies, OFWAT and LAs (especially the planning authorities) in order to satisfactorily address the problem of catchment scale urban diffuse pollution. This can be readily illustrated by reference to the issue of illegal connections where the LAs have major responsibilities through the Environmental Health offices but lack the resources and skills to be effective whilst water companies feel they have inadequate powers (as frequently the problem is within the house curtilage) and are also subject to EA enforcement. So all efforts are placed on control at the end-of-the-pipe rather than on source prevention. Much closer liaison between the LAs, EA and water companies under the Building Regulations would be helpful here as building control officers only need to ensure “adequate drainage” and the level of LA awareness of diffuse pollution is extremely low anyway. There might also be a useful prevention approach by requiring drainage inspection be undertaken as an integral part of the proposed ODPM house search information pack for vendors.

There is also considerable confusion over the “right to connect” and the “rights to discharge” and well as over the definition of a sewer, all of which predicate to some extent the introduction of source control procedures for both flood and pollution control. OFWAT is discussing with the water industry the issue of sewer definition, but rights of connection and discharge between all types of surface water sewers need to be resolved by legislative change in order to achieve more cost-performance effectiveness for alternative urban drainage solutions. It is also the case that there is a need for much stricter standards and responsibilities for O&M within future flood and pollution control measures.

(4) **Climate Change:** The 2004 OST Foresight review of flood defence has developed various scenarios for flood risk and CSO spillage although the report says very little on surface water flows and associated pollution. Volume uplifts of 33 per cent to 40 per cent are predicted for the 10 and 30 year RI storms and given that a large percentage of storm drains are less than 100–300 mm and only designed to a 50 mm/hour storm, they will have very little spare hydraulic capacity. Thus one can expect a substantial increase in “headwater” flooding in urban catchments both in winter (following longer wet periods) and in summer from increased short duration, high intensity storm events. The problem will be exacerbated as there will be less (~ 30 per cent) infiltration capacity in the winter period, and a 7 per cent—10 per cent urban creep factor (from infill development and paving over drives and gardens etc) also makes the problem worse. The loss of infiltration capacity especially in winter, will render infiltration control devices less efficient (up to 50 per cent fail now anyway) and thus a move towards on-site surface control approaches are likely to be preferred.
Damage costs are likely to rise by a factor of between 2–14 over the next decade with stormwater outfall discharges increasing by up to 35 per cent–40 per cent. These increased, climate-driven flows have knock-on water quality effects with enhanced and more frequent “first-flushes” and mixing of stormwater with sewage in manholes leading to problems of surcharging and consequent health hazards. There are of course, considerable uncertainties involved in these predictions eg receiving waters are quite likely to have higher dilution capacities and so may be better capable of absorbing enhanced pollution impacts, although the hydraulic impacts will remain. It is clear that under these climate scenarios, O& M will become much more important as will performance measures to monitor sewer condition and capacity.

Sewer Separation

3.1 It has been estimated that 5,000–10,000 litre rainwater tanks could reduce peak storm flows by up to 80 per cent for the one year event and that even 1,000–2,000 litre ranks (with mains water top-up) could reduce daily peak demands by up to 40 per cent. Theoretically, given a 600 l/d average household demand, about 300 l/d could be provided from rainwater contributions. Even if such tanks were used only as temporary storage devices, they could still help reduce flood risks in urban areas. Limited Impact Design (LID) for new developments could encourage disconnection and rainwater harvesting/storage as well as direct re-charge but the counter-effects of climate change and wetter winters could still mean more increased intra-urban flood risks.

3.2 The 2002 European Environment Agency (EEA) Flood Vulnerability report suggests SE England will have an enhanced 35 per cent climate-change impact in comparison to other member states. There will therefore be an adverse abstraction:availability ratio, so such disconnection and re-charge could be an important water resource. Following the Australian example of requiring capture and storage of the initial 20–30 mm of rainfall over a 24 hour period, would provide sufficient for garden irrigation, car washing etc, for at least the summer period and also provide some local re-charge potential. However, it is difficult to see how such disconnection and storage could go much beyond such usage, as toilet flushing would require the implementation of costly dual systems. Roof rainwater is not uncontaminated and can be of questionable and variable quality being potentially rich in SO2 and nitrous oxides, bacteria, metals and solids. There would be a need to divert the “first-flush” flow volume eg the initial 40 litres per 100 m2 roof area and also provide a filter device as well as systematic O&M. Such domestic tanked storage would need to be accompanied by statutory water quality and building guidelines and associated CoPs.

3.3 Very little attention has been paid to date of the opportunities for allowing surface ponding during rainfall events. Speed bumps for example, could not only provide traffic calming in residential streets and cul-de-sacs but also “embankments” between which impermeable surface water could pond up temporarily to a maximum of some several centimetres. Slow draindown via a throttle device in a gully chamber to a below-ground tank could also provide effective flow attenuation as well as water quality benefits through sedimentation of contaminants. Alternatively, such draindown storage water could be used to irrigate surface rainwater gardens. Substantial public education would be needed to overcome the undoubted social resistance to the acceptance of temporary street ponding.

3.4 It is highly unlikely that disconnection and storage will lead to any major replacement of the existing drainage infrastructure although it should be recognised that it has the potential for reducing the pollution load and flow volumes on this infrastructure, thus increasing the service life and investment returns.

PPCPs

4.1 Pharmaceuticals and Personal Care Products (PPCPs) comprise an “emerging” suite of PHS under the WFD and the EU has already indicated that diclofenac, iboprofen and clofibric acid are likely to be listed within the next or so. The EA estimate that the PPSP suite contains some 3,000 active substances within the UK market and is increasing by 3 per cent–4 per cent per annum. (Paracetamol at 2,000 tonnes/year and Prozac at 4 tonnes/year, are amongst the highest usage compounds within the PPCP suite). Changes and trends in lifestyles, personal health and an ageing population impose an increasing occurrence risk and a large proportion of veterinary drugs (such as antibiotics) are likely to by-pass sewage works treatment and pass directly to surface waters and/or groundwater. Theoretically, the majority of hospital and household drugs should pass to sewage treatment where tertiary processes (activated carbon, membrane filtration, ozonation) can largely remove them down to near detectable limits. Clofibric acid would appear to be the most difficult of the PPCPs to remove.
4.2 PPCPs occur in surface waters at very low residual, ultra-trace levels and are frequently recorded in the 5–20 ng/l level ie below the normal dose-response curve. They are also subject to high dilution ratios (frequently 1:100 +) in the receiving water and so the PEC:PNEC ratio is often less than 1 and so the genotoxic potential is low. However, whilst such ultra-trace levels may have a beneficial hormesis effect, it is not certain what are the long term, chronic effects of such persistent low trace concentrations. They may stimulate subtle changes in the aquatic population over extended periods of time and which may not be detected or ascribable to PPCP contamination. It is also the case that most monitoring work has been conducted under dry weather conditions (assuming worst-case dilutions), but there may be a wet weather “first-flush” problem in urban waters which is being missed. If there is bioaccumulation in benthal sediment, this reservoir would provide a continuous inoculum to the receiving water.

4.3 PPCPs have been recorded in surface water drains and are most probably related to misconnections in the stormwater system but the PPCP occurrence in this sewered system mean that STW discharges only contribute to a dilution of background levels already present upstream in the urban catchment. If such toxic substances are endemic in the surface water system, caution needs to be exerted on the re-use of such waters other than roof-derived, especially if infiltration systems are to be employed. Exfiltration from combined sewers may also be a local problem leading to enhanced PPCP concentrations in the enveloping soil horizons although there is minimum evidence to date of any substantial contamination to groundwater via this source.

4.4 The problem of PPCP in the aquatic environment requires the application of both preventative and regulatory approaches. The introduction of formalised, pro-active Environmental Stewardship programmes covering the full user chain would be one step. Product replacement and substitution should be urged by government and the health service eg natural omega food oils instead of anti-depressant drugs such as Prozac. It will undoubtedly be easier to replace many Personal Care products such as musks in perfumes, than many of the Pharmaceutical products. Campaigns to reduce usage rates, particularly of non-prescription drugs should be undertaken by government, the health service and industry. The introduction of bring-back (consumer) and send-back (distributor/retail) as well as re-cycling schemes should form a key component of any Stewardship scheme. Such prevention approaches may well yield greater reductions in environmental exposure for less investment than end-of-pipe control technologies. It would certainly give greater returns for a wider range of stakeholders (manufacturers, medical/health care industry and the public) as well as the environment.

4.5 More funding should be sought from the drug industry for R&D to examine the long term potential effects of ultra-trace concentrations in surface waters. There is an urgent need for medical service inputs as well as environmental science into this R&D; the issue of naming drugs across the EU (see The Lancet 2002) is just one instance of the need for a medical perspective. Further work is needed on PPCP degradation processes in STW to help underpin more robust, accurate regulatory risk assessment. There is also a major need to firm-up the EU drug licencing arrangements which currently are rather chaotic.

INTEGRATED WATER MANAGEMENT

5.1 There is undoubtedly a need for holistic, catchment level forward development planning; current planning policy is single-site focussed and there is infrequent refusal on flood risk grounds, and little if any consideration of possible surface water quality impacts. Between 15 per cent–50 per cent of EA recommendations at the planning stage are ignored by LAs. The previous OST flood review Committees have acknowledged this issue and PPG25 does state that development should not increase risk elsewhere. It is probably true that the insurance industry is currently exerting more pressure than the planning authorities to take a wider environmental perspective.

5.2 The UK planning system needs to adapt to contemporary environmental concerns and catchment-level flood and pollution risks especially given that by 2020, an additional 3.8 million houses will be built in SE England. PPG25 exhorts “protection” over “prevention” and in any case only offers potential control over the location of development and does little if anything for the overall runoff management or storage/carrying-capacity of the wider catchment. PPG25 does not specify mandatory consultation with the EA, who are severely limited in terms of their powers of restraint over development.

5.3 Higher level regional planning guidance is required anyway to be compatible with the WFD catchment approach and should bring together LAs and regional government, the EA water companies, NGOs, developers and other vested interest groups into consortia with powers of review for land use, building regulations, runoff management etc. Such liaison groups should also have a remit to examine the carrying capacity of catchments. In Scotland the Flood Appraisal Groups (or FLAGS) perform such high-level,
catchment review although there is growing evidence of tensions between the FLAGS and SEPA. It is certainly true that in England and Wales, the lack of such liaison groups means that it is ill-prepared for the forthcoming EU Floods Directive.

January 2006

Memorandum by WWF—UK

WWF welcomes the opportunity to submit written evidence to the House of Lords Science and Technology Committee’s inquiry into Water Management.

Current levels of abstraction of water mean that we are on a knife-edge with public water supply in England and Wales: when dry spells occur, the resultant over-abstraction can lead to very significant damage to the rivers and lakes of England and Wales. For example, in rivers such as the Gipping in East Anglia minimum water levels are only maintained as a result of the quantity of treated sewage effluent that is discharged into them.

Increasing levels of demand for water and projected changes in rainfall patterns as a consequence of climate change are likely to exacerbate these pressures. The rivers of England and Wales cannot be asked to bear these costs. The Water Framework Directive requires that the freshwater bodies of England and Wales reach good ecological status by 2015, and over-abstraction of rivers will result in failure to achieve this objective.

The Water Framework Directive

The Water Framework Directive (WFD) is widely regarded as the most significant piece of European environmental legislation ever passed. It requires rivers, lakes, and estuaries to reach “good ecological status” by 2015. The WFD represents a unique opportunity to introduce a modern approach to the management of waters in England and Wales, and address the inter-related pressures facing the water environment in an integrated, strategic way. The first River Basin Management Plans containing the Programmes of Measures designed to achieve these objectives must be drawn up and published by the end of 2009.

An initial assessment carried out by the Environment Agency in England and Wales discovered that 93 per cent of rivers, 84 per cent of lakes, and 99 per cent of estuaries are at risk of failing to meet good ecological status, illustrating the profound depth of the ecological crisis facing our freshwater environment. Of these, over 10 per cent of rivers have been adjudged at risk of failing to meet good ecological status as a result of abstraction—and therefore likely to require reduced abstraction on current levels by 2015.

There is, therefore, pressing need for action on water resources in England and Wales. WWF believes that there are three priority areas.

A. Demand Management

WWF believes that significant efforts are required to manage demand for water and increase water-use efficiency. The required actions are known: it is the political will that is lacking.

Due to rising demand, we are rapidly approaching a situation where further water abstraction will not be possible without significant environmental damage. This is not only undesirable in itself, but will place the UK in violation of the Water Framework Directive.

Huge scope exists for increasing the efficiency with which water is used. However, little significant effort has been made to date in managing demand for water. Many solutions are known, yet the political will to implement these has been lacking. The alternative to increased water efficiency will either be very expensive investment in water supply infrastructure—leading to further significant increases in water bills—or serious constraints to growth in certain areas of the country. Both of these are undesirable and presumably politically unacceptable.

Public understanding of water resource issues needs to be dramatically improved. There is a significant body of opinion that casts doubt on the need for water conservation given widespread misconceptions such as: “it always rains in Britain”; and “how come we need hosepipe bans when our house is at risk from flooding.”
Specifically:

1. Water pricing must be used more effectively as a mechanism for managing demand by both domestic and industrial users, without imposing unacceptable social consequences. For example, the Scottish Environment Protection Agency are currently consulting on plans to increase charges on a number of activities that impact on water in the natural environment and use the money raised to fund improvements to the water improvement in line with the Water Framework Directive. Very significant consideration must be given to the introduction of compulsory domestic water metering. Plenty of opportunities exist for domestic water pricing which allows an affordable quantity of essential water while penalising unnecessary and luxury use.

2. The Government should introduce high standards of water efficiency through its Code for Sustainable Buildings. These higher standards should then set the benchmark for future minimum building/water regulations. The government has proposed that the new standards for energy efficiency to be introduced by the Code for Sustainable Buildings should become incorporated as the minimum in future building regulations. The same should apply to water.

3. The introduction of a Water Savings Trust provides an obvious opportunity for the promotion of water-saving technologies and should be established.

4. Measures for the promotion of increased water efficiency in domestic goods, including labelling requirements and fiscal instruments such as VAT reductions, should be fully explored.

None of these needs be inherently problematic or unacceptably costly to any sector; each simply requires the necessary political will to be successful.

B. URBAN AND RURAL LAND-USE PLANNING

WWF believes that water resource issues are currently insufficiently accounted for in both urban planning and rural land-use policy.

Poor rural and urban planning exacerbates the underlying pressures on water resources. Construction in water scarce and/or high flood-risk areas necessitates the provision of expensive engineering solutions such as flood defences and water storage and treatment works, imposing unnecessary economic and environmental costs. Equally, the way in which rural land is managed has profound impacts on water resources. Mismanaged land can increase flood risk, while reducing the low flow volumes in rivers. Diffuse pollution from agriculture imposes very significant costs that must ultimately be borne by the water consumer, while reducing the volume of water available for use.

1. Town and country planning must take better account of water resources issues. In particular, the Environment Agency must have a stronger say in planning decisions.

2. The current situation where the taxpayer-subsidised agricultural sector imposes significant economic and environmental costs on the freshwater environment cannot be allowed to continue. Recent reforms of the CAP will go some way to addressing these problems. However, a government strategy for a sustainable rural economy that does not impose unacceptable impacts on the freshwater environment is urgently needed.

C. THE ECOLOGICAL RESERVE

WWF believes that there is a need for a review of the way in which water availability and abstraction is assessed and managed.

The increasing pressures on the freshwater environment mean that robust management of freshwater resources will be necessary. The introduction of the Water Framework Directive requirement that good ecological status be met in our freshwater bodies further reinforces this need.

The key concept in managing the ecological impacts of water abstraction is that of “environmental flow” or “ecological reserve”. Natural perturbations in the populations of riparian flora and fauna as a result of variations in river flows are to be expected. However, where water levels fall below a certain critical level due to abstraction, significant and unacceptable damage and mortality can occur. The ecological reserve is the minimum quantity of water that is necessary to safeguard against this level of unacceptable damage. Abstraction below this level should not be permitted—and would in any case result in violation of the Water
Framework Directive. Environmental flow requirements also include the need for variability throughout the year, including periodic flood events.

The current process for managing water abstraction in England and Wales is focused around Catchment Abstraction Management Strategies (CAMS). There are a number of aspects of CAMS which should be welcomed, including the attempt to specify Hands of Level off flows and the moves towards stakeholder engagement in the CAMS process.

However, increasing pressures on freshwater resources and the Water Framework Directive requirement for Good Ecological Status place further emphasis on the need for a robust definition and defence of the ecological reserve. There are concerns that the CAMS process is not currently achieving this and often appears biased in favour of abstraction: the ecological reserve is crudely and inappropriately set; climate change is not taken into account, a particularly acute threat in rain-fed rivers; wider freshwater needs such as wetlands are often not sufficiently accounted for; and sensible use of the precautionary principle is not made, for example to account for significant data and monitoring uncertainties or under-utilised abstraction licenses.

Taken together, these factors can mean that abstraction is licensed from rivers at dangerously low levels, threatening significant ecological damage.

1. A thorough review of whether the current approach to CAMS is sufficient to achieve the Good Ecological Status requirements of the Water Framework Directive is required.

2. Adequate powers and resources must be provided to the Environment Agency to redress existing cases of over-abstraction. A number of new powers were introduced in the 2003 Water Act. Sufficient will is required to ensure that these are used.

October 2005

Examination of Witnesses

Witnesses: Dr Tom Le Quesne, Freshwater Policy Officer and Ms Gwynne Lyons, Toxics Adviser, WWF-UK, examined.

Q507 Chairman: Can I welcome our two witnesses from WWF-UK. Would you like to introduce yourselves?
Dr Le Quesne: Good afternoon, I am Dr Le Quesne. I am the Freshwater Policy Officer at WWF-UK.
Ms Lyons: My name is Gwynne Lyons. I am a Toxics Policy Officer for WWF-UK.

Q508 Chairman: I have already alerted you informally to the fact that I am afraid there will be more divisions and we will be disrupted. We are sorry for that, but there is nothing we can do, it is called democracy. Would there be anything you would like to say by way of introduction or should we go straight into some of the questions?
Dr Le Quesne: I think we should get straight on under the time pressure.

Q509 Chairman: You very kindly submitted written evidence to us. You did stress your concern about the taxpayers subsidising an agricultural sector, which imposes significant economic and environmental costs on the freshwater environment. This raises the question, which we have raised earlier this afternoon, as to what is meant by “good” ecological status in the context of the Water Framework Directive. Perhaps you can tell us what you think good ecological status should mean? Indeed, how can we ensure that agriculture is better directed to minimise adverse impacts?
Dr Le Quesne: I think we can all share a general understanding of what good ecological status means. It means freshwater eco-systems where the long-term decline they have experienced is halted and reversed, where they are supporting typical eco-system functions and biodiversity populations. That does not mean to say that we want to revert to some kind of prelapsarian state. I do not think anybody is suggesting that, and I think we can all share a good general understanding. The Environment Agency is currently engaged in a much more detailed technical exercise to try and pin down exactly what good ecological status might mean, but I think we already have a very good understanding of the very significant problems which we face. The challenge I would invite this Committee to put its mind to is what are the measures we should be taking, regardless of how we precisely define good ecological status. We know what the problems are and I do not think the precise definition should hold us back from taking the measures which we need to take. As to the Directive more generally, we can see that it could go in one of two ways. On the one hand, we think it presents a really unique opportunity to introduce the kind of integrated strategic steps which we should be taking to manage our freshwater environment, whether there was a Directive or not. On the other
hand, we do remain quite concerned that it could turn into a paper elephant, such is the volume of paper it is generating, and end up being quite a bureaucratic process which does not result in significant change; we think that is a danger. Perhaps there are three priorities to focus on to make sure that the kind of action which is needed takes place. The first is something we have just been hearing about, which is the need for a more integrated approach. I know this Committee has heard a lot about the need for different elements of government planning, agriculture, water management within government and different elements of the private sector to work together. This is absolutely vital and I think we need to give some consideration to how that can be put on a more formal basis. Secondly, and again echoing something we have just heard, we think it is vital that a catchment approach is taken. Again, at a local level, each river has particular characteristics, so bringing the relevant parties together to identify the problems at that catchment and deciding what needs to be done and what are the sensible measures to take within that catchment. Defra are consulting on it, EA are shortly to publish their strategy and we think that could go either way. That is quite an important current issue.

Q510 Chairman: If we need to bring all of the interested stakeholders together, I suppose, to use the jargon, to determine catchment policies, do we have a mechanism to do that? How can that be achieved without using a top-down approach of the Environment Agency and sub-committees?

Dr Le Quesne: We do not have a mechanism at the moment. We have been arguing very strongly over the last year that one of the most important steps that the Water Framework Directive could achieve would be to introduce precisely that mechanism and precisely something that avoided it being a top-down bureaucratic approach. There has been a remarkable unanimity of opinion upon the need for that across all sectors, whether it is the environmental NGOs, the water companies, the agricultural sector and business. There is broad consensus that needs to happen.

Q511 Chairman: In your written evidence you put some considerable stress on your concern about the ecological reserve and the danger of over-abstraction in terms that the Catchment Abstraction Management Strategies were not robust in defending over-abstraction. Can we at least accept that rivers are, on the whole, cleaner than they would have been a few years ago or would that be complacent?

Dr Le Quesne: There has certainly been enormous progress made in cleaning up the point source pollution but, again, as the Committee has heard repeatedly, diffuse pollution is becoming an increasing problem. The social and economic challenge of diffuse pollution is much more complex than the challenges of point source pollution. The solutions for point source pollution are quite clear, you can introduce fairly simple regulatory measures, you cannot do that with diffuse pollution. It is a challenge to how we organise ourselves as a society, in many ways, to see how we can co-ordinate different functions of government and how we can get different sectors of society to take quite complex actions to reduce diffuse pollution. It is complacent to assume that all is well.

Q512 Lord Taverne: Returning to the question we raised with previous witnesses about the role of the priority substances directive. How do you see this? Do you feel it is realistic to call for the total eradication or major reduction of some of these substances? What are the benefits that you see coming from what are clearly considerable costs, including energy costs and environmental costs?

Ms Lyons: WWF undoubtedly supports the goals to reduce the inputs or to eliminate the discharges of these substances. If the UK is going to be serious about tackling river pollution, we have to set goals and actions to reduce the inputs of some of the worst pollutants. The cessation of discharges target is set for a date 20 years in the future, I do not think that really is too much to ask. What this cessation of discharges target is saying is that by then we need to have banned these substances or really only use them in closed-loop applications because what it is trying to do is give a steer that end-of-pipe solutions is not the way to go for some of those substances. What the worry is about these substances is that some have got endocrine disrupting properties and some are what are called P&B substances, which means they are persistent in the environment, they do not breakdown and they bio-accumulate, which means they build up in the bodies of us or wildlife. The concern about those sort of substances is that it is very difficult to predict the long-term effects of continuous exposure to such substances. If we get it wrong, if effects do come to light in future, because these chemicals are persistent and can bio-accumulate in the bodies of us or wildlife, we will not be able to eliminate exposure very quickly, it will be ongoing over subsequent years. That is what argues for a much more preventative approach for these substances. I think we have to realise that the Water Framework Directive has already been agreed, so we have to accept the mooted reduction and elimination of inputs of such substances. Anyway, the Directive does permit derogations from achieving such reduction targets if, and only if, it would entail disproportionate cost or it is unfeasible. I think the bottom line is that we should get on with trying to
achieve those requirements and try and cessate the inputs of some of these worst pollutants.

Q513 Lord Taverne: I am afraid the criticism is that it is not based on any very solid scientific evidence, it is just a vague fear of the future, that it disregards the old saying, Paracelsus’ law about, “It all depends on the dose”, and that, in fact, the cost of compliance could be fairly serious. Indeed, Yorkshire Water told us that the cost of compliance with the Dangerous Substances Directive would lead to a two-thirds increase in their output of greenhouse gases.

Ms Lyons: I would say it is science-based to know what you do not know. There are many things that we will not have tested for in all these chemicals. The fact is that we cannot predict the long-term effects of exposure to continuous low levels, and it is good science to recognise that. These are the sort of chemicals that have blindsided us in the past and have gone on to cause effects that we have not been able to predict. These are the substances for which you need a much more precautionary basis to regulation because if effects do come to light, you cannot stop that exposure. If we look back at the PCBs, nobody realised they were going to cause effects on brain development because they affected thyroid hormones, or whatever mechanism it is by which they cause those effects on brain development, and yet subsequent generations of children have been affected by these substances. We would not have known to test for that at the time, so it is these characteristics of bio-accumulation and persistence that I think it makes good sense scientifically to be more precautionary about. With regard to Paracelsus, about “The dose makes the poison”, we also know now that it is the timing of the dose that is very important. The problem with these bio-accumulating substances is that they build up in our bodies and they can be passed on to subsequent generations in the womb or in the egg. When the period of rapid cell division happens, it is the time when those organisms are most susceptible. Again, that argues for being much more precautionary about those bio-accumulating substances. Also, we know from many of these substances that they can be additive effects. For example, we know that oestrogen disrupting chemicals or thyroid disrupting chemicals can be present individually below the level at which individually they cause effect and yet together they can act additively to tip us over the effect threshold. From WWF’s bio-monitoring we know that we are, as a species, both us and wildlife, now carrying body burdens of several persistent and bio-accumulating chemicals.

Lord Taverne: The cocktail of chemicals is a separate subject which I do not want to go into now.

Q514 Lord Lewis of Newnham: Essentially, I think you have covered the point I wanted to raise, which was on endocrine disruptors. It seems to me that you have covered that particular point. I would symphatise totally with your concept that you have got a problem with bio-accumulation and the whole section on that. What I found very interesting, if I may refer back to your initial statement—I think you were asked what good ecological status is—it does strike me that, in fact, some definitions at this stage have got to come along somewhere. It is rather like the elephant; we all recognise it, but we find it difficult to define. Essentially, I think that is what you were saying to us about your ecological statement. The one interesting feature which has occurred over the last 20 years is we have moved away from a chemical to a biological assessment. It seems to me that this is where we are now in very, very great difficulty because biological assessments are difficult to categorise in any particular way, other than using the sort of terms you have been using. Ms Lyons, where you are talking about things like bio-accumulation and things of this particular nature. Much of the EU regulation, however, is end-of-pipe chemistry, not biology. How do you deal with that particular dilemma?

Dr Le Quesne: There are two aspects to your question. One of the great strengths of the Water Framework Directive is it does allow us to take that overview. Rather than producing, across the spectrum of freshwater issues, a prescriptive standard without allowing them to consider any alternative environmental objective, it does allow you to consider social and environmental issues when you are deciding on the measures which need to be taken. Coming back to this issue of defining exactly what it looks like, I do recognise the importance of that. As you will doubtless have heard many times, the Environment Agency’s initial assessment of the likelihood of freshwater bodies in England and Wales meeting that status found that over 90 per cent of the rivers of England and Wales were at risk of failure. What that tells us is we are so far short of good ecological status that our challenge as a society is not to think at great depth about exactly what that looks like, we need to start thinking about what we can do to start to move ourselves in the right direction because I think it is very, very unlikely that any time in the near future we are going to overshoot it. We are so far short of it that the challenge is to start moving in the right direction.

Q515 Lord Lewis of Newnham: Still we have this basic problem of what are we going to use as some form of criteria to establish the sort of effects you are talking about. I agree with Lord Taverne, we are not talking about insignificant amounts of money that are going to be involved in some of these issues, so
there has got to be some basic assessment, definition, if you like, of the sort of range of problems. As we were discussing earlier, if you look at the quality of rivers, river quality is measured on the length of the river. In Scotland, where you have large numbers of bubbling streams, you have a very high quality for your river, but in this country, where, of course, you have sluggish wide rivers, it is not measured in terms of volume, then, of course, this brings statistics down. These are all factors which become rather important when you are trying to make environmental assessments.

Dr Le Quesne: They are all factors and the Environment Agency is working on a very detailed technical assessment of what good ecological status looks like, which will contain a basket of biological indicators. Again, I reiterate that we are so far short of that, and there are measures which we should be taking anyway. The way in which we manage our freshwater in this country is not efficient and then there are some imaginative steps we can be taking to improve things. If I may give you an example from a project that WWF is involved with on the outskirts of Doncaster, which is to take the main mother drain out of the city, which collects water from storm run-off and the outflow from a primary sewage treatment works. We are constructing, with the help of a number of partners, a 75-hectare wetland which will take that water which will go through that. This will serve a number of functions. It will perform important functions in reducing the levels of pollutants in that run-off water, and the site will serve to hold flood waters at certain times. It is a fantastic bio-diversity amenity, right on the edge of Doncaster in between the city and the motorway, where the existing workings are home to some fantastic wetland birds. That is the kind of imaginative solution which I hope the Water Framework Directive will encourage us to think about.

Q516 Baroness Platt of Writtle: You state in your written evidence that water resource issues are insufficiently accounted for in both urban planning and rural land-use policy, what practical steps can be taken to address this problem?

Dr Le Quesne: My Lord Chairman, I wonder if we might take those one after the other because they are quite different issues. To start with urban planning: this Committee has heard a great deal of evidence on a lot of those aspects, much of which we would concur with. There needs to be very serious consideration given to siting major new developments in water scarce areas, and if you are going to do it, then the issue of water efficiency needs to be taken very, very seriously. The problem cannot be brushed under the carpet. I would like to comment on one particular point on that: WWF does a lot of work on sustainable housing, new build housing, and how that might be more environmentally friendly and more efficient. The Government’s steering group on sustainable homes has just published its draft code for sustainable housing. WWF was on that steering group but withdrew from it in November in objection to both the process with which the Government drew up that code and objecting to the actual draft code itself. We felt that it went backwards on existing commitments, the standards it set, including the standards for water efficiency, were simply not ambitious enough. It relied far too much on voluntary measures when even existing regulations are not being complied with, and there was no introduction of any kind of incentive measures, either through the tax system or the planning system. I am happy to provide the Committee with more written evidence on that.

Q517 Chairman: It would be helpful if you sent in your reasons for withdrawing. I think we would like to see it.

Dr Le Quesne: Turning to rural planning: I think there are two points I would like to pick up. Firstly, if we are going to pay farmers and land managers in this country, they should be paid to provide services that are of public benefit. We welcome the decoupling of the Common Agricultural Policy subsidy from production and we are very keen to see it recoupled so that land managers are paid to provide services of public benefit. One of the major ones of those would be in terms of water management, whether it is in terms of water quality or in terms of flood storage, water management like that, so immediately the Government should use as much of the next round of CAP for agri-environment payments and include water resources in that. In the medium term, it should be looking to shift what payments there are into agri-environment schemes. The second point of concern is what we need to think about doing in addition to further regulation. The Committee heard last week from Andrew Clark from the National Farmers’ Union that the farming industry has a problem of ownership with the problem of diffuse pollution. We would entirely agree with that. We are not going to be able to solve the very complex problems of agricultural pollution without farmers themselves getting a grip on the problem and themselves taking ownership of the solution. In addition to possible new regulations, I think there are two measures which we would like to propose. Again, the first comes back to this issue of bringing people together at a catchment or a sub-catchment scale. Around Europe and around the world there are many, many examples of very successful approaches where land managers and farmers have been brought together at a catchment and a sub-catchment level to identify problems and to work towards solutions. I think this is an approach we need to be promoting more...
strongly. Lastly, we need to be putting much more energy into thinking how we can take legal action against the worst diffuse polluters. There is significant difference within areas as to which farms are responsible for diffuse pollution, it is not an equal issue. If you go to any area, people will know who the “bad farmers” are. I do not think it is fair for the bad farmers to drag down new regulation on all farmers and land managers. Alongside a participatory approach, we need to be thinking how we can help with much more targeted legal action against underperforming farmers.

Q518 Baroness Platt of Writtle: You have also called for the Environment Agency to have a stronger say in planning decisions. What precisely do you envisage and is it practical for the Environment Agency to be consulted on individual planning applications?

Dr Le Quesne: Again, this comes back to the need for some form of strategic planning at the catchment level. Planning authorities need to take water issues into account, both in terms of water resources and in terms of storm water. It seems to us to be clearly practical that the Environment Agency and the water companies should be involved in discussions around those issues. If they are not, you end up placing very significant costs on the economy. It is expensive to provide water resources and it becomes increasingly expensive to provide water as quantities become more scarce. There is a danger of imposing very inefficient costs on society if you do not have effective communication between authorities responsible for planning and those who are responsible for providing water.

Q519 Baroness Sharp of Guildford: This question picks up what you have just been saying. You suggest in your written evidence that adequate powers and resources must be provided to the Environment Agency to address the existing cases of over-abstraction. Why do you feel that the current powers are inadequate? What assessment have you made of the likely impact of further abstraction restrictions upon water companies and farmers?

Dr Le Quesne: We think it was unfortunate that the 2003 Water Act did not provide statutory provision for the conversion of permanent abstraction licences into time-limited abstraction licences. Over 90 per cent of licences are permanent abstraction licences which provide no flexibility in the system for the renegotiation of those licences in any way, shape or form. The upshot of that is that it requires very significant financial resources or political will to redress situations of over-abstraction and we are concerned that there are unlikely to be sufficient quantities of either of those to take the necessary measures. In terms of what the impact is likely to be, it is worth emphasising that a very considerable majority of the volume of water from, for example, something like 600 abstractions that have been identified as priority problems for the Habitats Directive is water that is abstracted for public water supply. No one is suggesting that abstraction licences should be revoked where this places any threat on public water supply but, again, as this Committee has repeatedly heard, there are a whole series of alternatives available to water companies to augment public water supply, including increased efficiency and reduction of leakage. Where you are looking at—as you are in the vast majority of those currently identified as critical abstractions—abstraction for public water supply, there are alternatives.

Q520 Chairman: I wonder if we can come back to the ownership of diffuse pollution, which on the face of it seems a perfectly reasonable concept but, as you can imagine, it has been represented to us by farmers slightly differently. If you have a herd of cows and they are emitting methane, for example, in a diffuse way, it is very difficult to see what you are meant to do to try and limit that diffuse pollution. Indeed, if you are encouraged, as you certainly are, by the market at the moment, to be ever more efficient in achieving economies of scale, although the number of the national herd may not increase, certainly the number of cows living in one place will do. Is it reasonable to say to farmers, “That is your problem”, or is this something that is within the control of farmers?

Dr Le Quesne: I think the way you present it is to somehow misinterpret what we are suggesting. It is not to wash our hands of it and turn it over to farmers and say, “That is your problem”. It is to engage them in more of a dialogue about what can be done on farms to improve performance. It varies enormously in different agricultural sectors. There remain very significant improvements which are possible simply through good agricultural practice. It will not solve all of the problems. I do not think we should pretend for a minute that it will, but there remain significant improvements and many of these improvements save money for farm managers themselves. It is important to identify those where they are possible and to try and breakdown what is often a relationship of suspicion between people in the farming and land management community and the various authorities who are responsible for these matters. If you engage with a group of farmers on a sub-catchment, it is also possible to try and provide some kind of grant assistance to identify and provide them with matching grants for the most important issues. There are things which can be done while maintaining productivity which reduce impact and it is important to identify those.
**Q521 Lord Whitty:** Going back to what you were saying about the encouragement of farmers through the subsidy system, if the subsidy system is to exist, and in view of the recent deal it is likely to consist broadly in its existing form until 2013. You said the best way of doing that would be to have agri-environment schemes with a big water management content, as far as I understood you, but, of course, agri-environment schemes are themselves elective, they are not mandatory and the best farmers will therefore be going for those schemes. Would it not be better, or at least in parallel, to operate through the Single Farm Payment and the conditions attached to the Single Farm Payment which, because of the sequence of when Directives were in place, does not at present have much in relation to water management in the cross-compliance conditions?

**Dr Le Quesne:** Yes, it would be, but, again, it is to distinguish between two types of changed behaviour that you might see from farmers. In terms of good practice, that is the kind of measure which would make sense to come through cross-compliance. The extent to which cross-compliance would be enforced remains to be seen. Clearly, it makes sense to include water resource issues within cross-compliance, not to include them does not make good social or economic sense. There are other types of measures which we might expect farmers to take which will need supportive funding. For example, if you were looking at moving over to more significant use of sustainable flood management, where you are using land to hold flood waters or where you are using changed land practices to alleviate flooding, under those circumstances I think it is reasonable to expect that there will be some contribution to farmers for the performance of those services. Again, it is important to distinguish between what farmers should be doing as a requirement and then additional services which they may be providing for which they can reasonably expect to be subsidised by society.

**Chairman:** I think I will bring things to a conclusion. We would be grateful if you can send us further information on your concern about the draft of the sustainable housing guidelines which you pulled out of; it would be helpful. Indeed, on reflection, if there is anything else that you feel you would like to send in a further note on, we will always be happy to receive that. Thank you for a very informative session this afternoon. We are most grateful to you for sparing your time. I am relieved that we were, in fact, not disrupted a second time. Thank you.

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**Supplementary evidence by WWF-UK**

**INTRODUCTION**

WWF is concerned about chemicals in the aquatic environment because chemicals can have acute and/or chronic toxic effects, persistent (P) and bioaccumulating (B) chemicals may build up in organisms to levels that cause harm in future, and humans may be exposed directly to hazardous chemicals which eventually find their way to the aquatic environment, and they may also be exposed to hazardous chemicals via drinking water and via eating contaminated aquatic biota.

This addendum relates primarily to WWF-UK’s concerns about chemicals with endocrine disrupting properties. It should be read in conjunction with WWF-UK’s oral evidence outlining the concern about persistent (P) and bioaccumulative (B) chemicals.

WWF-UK’s concerns about chemicals with endocrine disrupting properties are focused principally on the potential for chemically-induced effects on reproduction, the immune system, and thyroid function.

**ADDITIVITY OF ACTION**

Several studies are now showing that endocrine disrupting chemicals, including anti-androgens, oestrogens, and thyroid disruptors, can act additively and cause effects even if each individual chemical exposure occurs at a level below the concentration known to cause effects. For example, two phthalates with a similar mechanism of anti-androgenic action can give rise to additive effects (Foster et al., 2000).

Furthermore, toxicants that induce malformations in androgen receptor dependent tissues can produce cumulative effects even when two chemicals are acting via different mechanisms of action (Gray et al., 2002). Interactive effects, including additivity or synergism, also occur with other mechanisms of action. For example, additive effects of has been shown in fish exposed to a mixture of estrogenic chemicals (Brian et al., 2005), and similarly Crofton and colleagues (2005) have shown that when several thyroid disrupting chemicals are given to rodents, effects can occur even when each chemical is given at a dose level below their no effect concentration.
Similarly, suppression of the immune system can also be caused by exposure to several substances. For example, atrazine and eight other pesticides were mixed at relatively low levels (0.1ppb each compound) to replicate inputs on a cornfield, and frogs exposed to this mixture developed an array of health problems, including meningitis, because these chemicals suppressed their immune systems. In addition, additive effects have been shown in fish exposed to atrazine and simazine (each at concentrations of 0.5ppb), where the level of expressible milt was reduced in mature male Alantic salmon parr, due to reduced olfactory response to the female priming pheromone.

**Widespread Wildlife Exposure to Endocrine Disrupting Chemicals**

**Vitellogenin Production in egg laying species**

Exposure of wildlife to endocrine disrupting chemicals is widespread. For example, there is a useful biomarker (vitellogenin production) which can be used to show when egg-laying species have been exposed to oestrogenic, sex hormone disrupting chemicals. Vitellogenin is the precursor egg yolk protein, and is normally only produced by the female of the species, or in very much lower levels in males. Worldwide, in or around polluted waterbodies, there are now numerous reports of abnormal vitellogenin production in male fish (Matthiessen, 2003), birds (EC, 2003), reptiles (EC, 2003) and amphibians (Renner, 2003), showing that there is widespread exposure to oestrogen mimicking pollutants.

Fish are the most studied wildlife species, and in male fish in the UK, in both freshwater and marine species, vitellogenin production has been reported (Purdom et al, 1994; Lye et al, 1997 & 1998). In many UK rivers downstream of sewage treatment works it seems that a large part of the estrogenic component is derived from the natural female hormones (estrone and estradiol-17b) and the birth control pill (ethinyl oestadiol) excreted in sewage (see Jobling and Tyler, 2003). However, in some UK rivers and estuaries, industrial endocrine disrupting chemicals, such as nonylphenol, have also been implicated as a causal factor (Thorpe et al, 2001; Lye et al, 1999). In addition, research by UK workers at CEFAS has shown that effects due to exposure to hormone disrupting chemicals are evident in fish found in the open waters of the North Sea (2005). Male cod have been found to be abnormally making vitellogenin, and although the causal agent has not yet been identified, it seems to be due to compounds that are taken up through the food chain.

**Genital disruption and other adverse effects in fish**

Vitellogenin production is just one of many effects that may be caused by exposure to sex hormone disruptors. For example, the presence of genital disruption manifest as intersex or ovotestis (ie primary or secondary oocytes abnormally present in the testicular tissue) is also now a frequently reported phenomenon in fish. In some very estrogenically contaminated UK estuaries up to a fifth of the male flounder and blenny in some locations show ovotestes, whereas ovotestes has not been seen in flounder from a relatively uncontaminated reference estuary, the Alde (for review see Matthiessen, 2003). Other fish species may exhibit other effects, and for example, sand gobies from oestrogen-contaminated estuaries in the UK do not show either induction of vitellogenin or intersex, but instead male fish exhibit deformed and feminised urogenital papillae, which is the structure used by both sexes to deposit gametes (Matthiessen et al, 2002).

Migrating fish may also be particularly vulnerable to contaminants. In Canada, a nonylphenolic surfactant used in pesticide formulations has been linked with the decline in catches of salmon and herring. Nonylphenol, which can act as an oestrogenic compound, appears to interfere with osmo-regulation and the major hormonal changes that the fish must make during migration when adapting to salt water from fresh water (Fairchld et al, 1999). Other contaminants such as atrazine, which is also known as an endocrine disruptor, also seems to be able to affect fish migration, as exposure of salmon smolts to atrazine in fresh water can compromise their ability to survive in saline conditions (Waring and Moore, 2004).

**Genital disruption in other wildlife species**

In many mammalian species (including otters (NBS,1996), mink (Harding et al, 1999), whales (Michaelian et al, 2003), polar bears (Wiig et al, 1998), black and brown bears (Dunbar et al, 1996; Cattet, 1988), panthers (Facemire et al, 1995), and deer (Veeramacheneni et al, 2005)), there are also now reports of genital disruption, including un-descended testes and/or shorter phallus and/or intersex features. Indeed, the endocrine system has been conserved in evolution, so all species will likely be vulnerable.
OTHER EFFECTS NOTED IN MAMMALS FEEDING ON THE AQUATIC FOOD CHAIN

Otters

Several pollutants have built up in the food chain, and are found in the fish that both we and wildlife may eat. For example, otters in Europe have been affected by pollutants in their food chain, and although in the UK, otters are now breeding more successfully, in some rivers the population growth is still slow (Mason and Macdonald, 2004). Overall, in the EU, the otter population distribution is still reduced (Pertoldi et al, 2001; Roos et al, 2001; Fourneir Chambrillon et al, 2004).

Seals

In the marine environment, reduced reproduction has also been reported in seals. In the mid-eighties a study showed that female harbour seals fed fish from the polluted Wadden Sea had half as many pups compared to seals fed fish from the less contaminated Atlantic (Reijnders, 1986). Furthermore, a later study showed that female harbour seals fed fish from the polluted Wadden Sea had impaired immune systems compared with seals fed less contaminated fish from the Atlantic (de Swart et al, 1994). Reproductive problems in seals have reduced over time, but there are indications of immune system effects becoming more prevalent (Bergman, 1999). Such effects may be linked to mass die-offs when diseases strike (Hall et al, 1992).

Arctic Species—Whales and Polar Bears

Species in the Arctic are particularly under threat due to global re-distillation of persistent and bioaccumulating compounds. Releases of persistent and bioaccumulating compounds from the UK, other EU countries, and globally, may be carried on air and ocean currents to more northerly latitudes. Unfortunately, polar bears in polluted areas have already been shown to have impaired immune system function linked to exposure to man-made chemicals (Bernhoft et al, 2000; Lie et al, 2004), and some have been seen with intersex genitals. Similarly, some whale populations in the northern latitudes are also highly contaminated, and are not reproducing very well (see Reidel et al, 1997).

HUMAN IMPLICATIONS

Human exposure to endocrine disrupting chemicals will arise from a number of sources, including but not limited to, the use of some consumer articles and personal care products, as well as via drinking water, and via eating fish or other contaminated biota.

Ensuring reduction or elimination of the inputs to the water environment of endocrine disrupting chemicals, or persistent and bioaccumulating chemicals, will reduce human exposure. The following effects have been associated with chemicals, although at present there is uncertainty about the effects of endocrine disrupting chemicals in humans, and/or the precise mechanism of action.

Testicular Dysgenesis Syndrome (TDS)

In the scientific community there is great concern about the possibility that defects in male reproductive health are increasing. There is evidence to suggest that birth defects of the genitals in baby boys, poor sperm counts, and testicular cancer—are all symptoms of the same underlying entity which has been termed testicular dysgenesis syndrome (TDS), and that it may be caused by exposure in the womb to hormone disrupting substances which block androgen action (Skakkebaek et al, 2001). The fact that a similar syndrome can be induced in laboratory rodents exposed to pollutants (Gray et al, 1999a & 1999b & 2001), and that symptoms similar to TDS are found in many wildlife species living in polluted areas, suggests that pollutants may indeed be involved to some extent.

Deficits in Brain Development

It is alarming that in recent years several studies clearly show that PCBs have been at levels that have affected cognitive brain function in babies born in developed EU countries (Patandin et al, 1999; Walkowiak et al, 2001). In the Netherlands, for example, a large cohort of mothers and babies were studied, and in 2004 a study was published showing that even at age nine years the children exposed to the highest background levels of
PCBs still showed affects on brain function, particularly sequential processing of information (Vreugdenhil et al., 2004).

Thyroid hormones orchestrate normal brain development, and dioxins, furans and PCBs have been associated with altered thyroid hormone levels in experimentally exposed animals, and in mothers and infants exposed at the upper range of normal background levels (Koopeman-Esseboom et al., 1994). However, many chemicals can disrupt thyroid function, including some of the brominated flame retardants (see EU RARs; Fernie et al., 2005), and some pesticides (Brucker Davis, 1998). Unfortunately, because brain development in humans takes place over a long time period, it is likely to be particularly vulnerable to chemical insult.

**Hormone—Related Cancers**

Another major concern is the potential role of endocrine disrupting chemicals in other hormone related cancers, like breast, and prostate cancer, where some research is raising concerns (Hoyer et al., 1998 & 2000; see review Evans, 2006; Ralph et al., 2003; Wetherill et al., 2002; Alavanja et al., 2003.)

**Diabetes and Obesity**

Other studies are now linking some EDC with effects like diabetes (Alonso-Magdalena et al., 2006) and obesity (Masuno et al., 2002; Heindel et al., 2003; Mead, 2004; Duke university, 2004; Baillie-Hamilton, 2002), but here the science is still at a very early stage.

**Immune System Deficits**

In the Arctic and in Europe there are data which associate the intake of persistent and bioaccumulative chemicals with effects on the immune system in babies (Dewailly et al., 2000; Weisglas-Kuperus et al., 2000).

**Conclusions and Call for Prevention of Exposure**

Nowadays, both wildlife and people are exposed to a plethora of chemicals, and it therefore makes sense to try to eliminate those that are know to disrupt biochemical pathways, particularly if many compounds can act on that same pathway. Exposure occurs not only from current intake of chemicals in polluted air, water and food, but also from existing body burdens of chemicals that have bioaccumulated in our bodies over time, like PCBs, dioxins, and DDT related substances etc. Furthermore, it seems that safe levels have been anyway overestimated for some pollutants, individually. For lead, for example, it seems that there may be no safe exposure level (Wigle and Lanphear, 2005).

**Climate Change will Exacerbate the Effects of Pollutants**

Climate change will exacerbate the situation for several reasons. Firstly, if climate change leads to less rainfall and higher temperatures, the flow of rivers will be reduced leading to less dilution of contaminants and therefore higher exposure of wildlife. Secondly, climate change may mean that organisms are already under stress, and this may make them more sensitive to effects. In addition, some contaminants, like PAHs have increased toxicity when there is concurrent UV exposure. On the other hand, increased sunlight may lead to quicker breakdown of some contaminants, although this is less liable to be important for chemicals that adhere to particles and sediments.

**Further Action Needed**

With regard to how to do reduce or eliminate inputs, WWF considers that there is a need to add a requirement under Article 4 (pollution control) of the Proposed Directive on environmental quality standards and pollution control in the field of water policy and amending Directive 2000/60/EC. WWF considers that there should be a requirement for Member States to draw up plans for the reduction of diffuse pollution. A particular focus should be the need to eliminate losses of Priority Substances (PS) or Priority Hazardous Substances (PHS) from articles.
Furthermore, WWF considers that other substances such as lead and trifluralin should be identified as PHS. We therefore look forward to the Commission identifying further PHS in future. Moreover, there is also a need for environmental quality standards in sediments and biota, as is required by Directive 2000/60/EC establishing a framework for Community action in the field of water policy (the Water Framework Directive). WWF considers that monitoring of sediments and biota is needed to evaluate trends in the levels of pollutants over time.

February 2006

Further supplementary evidence by WWF

WWW BRIEFING: CODE FOR SUSTAINABLE HOMES

INTRODUCTION

Housing generates nearly 30 per cent of the UK’s carbon dioxide emissions and the way homes and communities are developed has a major impact on lifestyle choices, which in turn impact on the environment. Over the last four years WWF has been campaigning to move sustainable homes to the mainstream of housing in England and Wales, through our “One Million Sustainable Homes” campaign. Creating sustainable homes is good for consumers, good for business and good for the environment.

WWF was the only NGO represented on both the Sustainable Buildings Task Group (SBTG), which originally recommended the development of the Code, and the Code Senior Steering Group. We therefore have a very strong interest in seeing that the new Code meets the objective of greatly reducing the environmental impact of new homes, and over time of the existing housing stock and other buildings. Although the Code will only be required for publicly procured new housing, it is vital government gets it right:

— One of the biggest barriers WWF and its partners have faced is the lack of single commonly recognised standard for a “sustainable home”. This was exemplified by our discussions with financial institutions about the potential introduction of market based consumer incentives to encourage the purchase of sustainable homes (eg preferential mortgages and insurance products). We firmly believe that the Code for Sustainable Homes has the potential to help fill this gap.

— One of the aims of the Code was to signpost the future direction for improvements in building regulations, thereby giving industry clarity and certainty on the direction of future regulation.

PUBLICATION OF DRAFT CODE

On the eve of the publication of the draft code, on 30 November 2005, WWF resigned from the Senior Steering Group, primarily because we felt unable to defend the draft Code (which we had not been consulted on), which represents less than existing government commitments regarding standards for publicly funded housing.

Currently, government agencies including Housing Corporation and English Partnerships are required to reach the BRE EcoHomes “Very Good” standard. As it stands, the draft Code does not represent a standard equivalent to this. This is because EcoHomes is “constitutionally committed” to being beyond building regulations, and even at Level 3 (the entry level for government agency housing) the draft Code only requires compliance with the statutory minimum building regulations for energy efficiency (Part L).

Furthermore, the draft Code does not include those elements of EcoHomes that address the proximity of new housing to public transport nodes, or the ecological assessment of proposed development sites.
17 January 2006

WHERE DOES WWF STAND NOW?

Over the course of the public consultation period (which ends at the beginning of March), the Code can still be transformed into the kind of standard that is so urgently needed. The fact that the Code is now largely based on the EcoHomes methodology (BRE came into discussions late in the day), means that it can:

(a) Capitalise on the familiarity with and support for EcoHomes amongst housebuilders.

(b) Improve on the weaknesses of the existing EcoHomes standard, for example by setting minimum standards in areas like energy, water, waste and materials, whilst providing sufficient flexibility for developers on a site by site basis.

(c) Genuinely set the trajectory towards step change in the housing sector, with the top level of the new Code representing standards such as carbon neutral development.

As it stands, almost no-one supports the draft Code, but WWF will respond constructively to the consultation and will contribute to the process to develop the Code in whatever way we can. By adopting EcoHomes (including revisions addressed in point “(b)” above, which are scheduled for April 2006) and re-naming it as the Code, the Government could expect very widespread support from the industry, public agencies responsible for housing supply, and environmental organisations including WWF.

February 2006
TUESDAY 24 JANUARY 2006

Present: Broers, L
Howie of Troon, L
Lewis of Newnham, L
Platt of Writtle, B
Perry of Southwark, B

Selborne, E (Chairman)
Sharp of Guildford, B
Taverne, L
Whitty, L

Examination of Witnesses

Witnesses: Dr Mike Farrimond, Director, UK Water Industry Research, Mr Ron Chapman, Chief Executive Officer, Mr Dene Marshallsay, Head of Demand Management, WRc plc, Dr Katherine Hyde, Director and Mr John Hart, Senior Consultant, Centre for Environmental Consultancy, Building Research Establishment, examined.

Q522 Chairman: On behalf of the Committee could I extend a welcome to the five of you? Would you like to start by introducing yourselves?
Mr Hart: My name is John Hart; I am a senior consultant in the Centre for Environmental Consultancy of the Building Research Establishment. I work there with Dr Hyde, my colleague, in the team responsible for water efficiency and water products in homes and buildings.
Dr Hyde: I am Dr Katherine Hyde; I am the Director for the Centre for Environmental Consultancy at the BRE in Watford. I have a career of about 30 years in water management, water quality control, water analysis and arranging environmental management consultancies.
Dr Farrimond: I am Mike Farrimond; I am the Director of the UK Water Industry Research. This is the organisation established by the water companies, public and private, in 1994 to manage collaborative research forums; we do not carry out research, we are effectively a buyers co-operative for research funders.
Mr Chapman: I am Ron Chapman, Chief Executive of WRc and I have brought along Mr Dene Marshallsay, who is Head of Demand Management.
Mr Marshallsay: My name is Dene Marshallsay; I head up the Demand Management Team for WRc. Our prime area of responsibility covers demand management, water efficiency, leakage and metering.

Q523 Chairman: Thank you very much. I should warn you that the acoustics in this room are appalling and not all of us claim to have perfect hearing anyway. So if you could speak up, as I am now, that would be very much appreciated. Could I also draw attention to the public information sheet that is available at the door for any member of the public who wishes to see the terms of the inquiry and the interests that we have. Would any of you like to say anything by way of introduction or shall we go straight into the questions that we propose to ask? As none of you appear to want to say anything we will start on our questions. Do not feel that each of you must answer each of the questions; we will try to get through quite a lot of questions as rapidly as we can, and you may feel that there will be no need for a particular individual to address some questions. Could I start by asking how does the water industry consult, undertake and commission research studies? Consultancy of the building Research Establishment. I work there with Dr Hyde, my colleague, in the team responsible for water efficiency and water products in homes and buildings.
Dr Farrimond: Shall I start on that one? The water companies invest to solve their own specific problems, which they do individually, and they also collaborate with other water companies and other agencies through a variety of means, one of them being UKWIR. What you see in the annual report and accounts is a measure of the operational costs spent on research and development and because of the capital nature of the industry large amounts are also spent on capital feasibility. £50bn has been invested by the companies in capital in the last 15 years and a certain small element of that would be called feasibility, which could be classed as research; for instance, testing out new processes for sewage treatment and water treatment. Our annual programme has a process that starts in the spring when we work with all the companies and 12 specific individuals from the companies who have a remit to look after a specific sector; so, for instance, water resources or drinking water and wastewater treatment. We run workshops to help them discuss what the priorities might be to generate projects. These are prioritised through the summer and we usually start the programme in the following spring. So these 12 people whom we call the client managers and they are the people that we look to in the industry and they bridge the policy research gap, so they bring the policy needs to our agenda and the companies decide what the priorities should be.

Q524 Chairman: Are you content that Ofwat’s calculations take adequately into account the need for research by the industry?
Dr Farrimond: I think Ofwat would say—and I am not here to speak for them—that research and development is an operating cost and it is for the companies to decide how they spend their operating costs. So there is not a specific allocation within the Ofwat calculation for research and development.

Q525 Chairman: Do you think this gives enough leeway for the companies to undertake the strategic research which you might think wise for an industry which is facing some quite major issues over the next decades?

Dr Farrimond: I think the companies will argue that there is an imbalance between reward and risk when it comes to Ofwat calculations and that there is a five-year programme, as you know, to determine charges, and often that does not balance the long-term benefits to businesses. If water companies invest in new processes and that process does not work properly then they have to reinvest and that reinvestment is not covered in charges. So there is little incentive to try out new processes when there is such a downside to the investment.

Q526 Baroness Sharp of Guildford: I wonder whether you could tell us a little bit about how the competitive nature of the water industry in England and Wales affects the level and the scope of the research that is carried out and the sharing of knowledge? In particular it would be interesting to know how the private water companies in England and Wales compare to the public bodies in Scotland and Northern Ireland in terms of the research undertaken?

Mr Chapman: Prior to privatisation, if you compare the amount of money that has been spent in England and Wales by the constituent parts of the water companies on research it is actually roughly about the same level in total as it is today. So in that sense privatisation has not altered the volume of spending on research. I think what it has done is altered the types of projects that are being funded, and the very intense economic pressures that the companies are under and the timescales under which they are guaranteed funding means that it is much harder today to get long-term funding for long-term programmes of research, and more money is focused on short-term returns. I am not an expert on the situation in Scotland; I can only say from my point of view that as a company we have noticed quite a sharp decline in research spending in Scotland since the new arrangements went into place there.

Q527 Lord Taverne: On the question of the total level, you say it is roughly overall the same level as it was before, but the problems which it faces today seem to be rather more serious than they were in the past, or are perceived as more serious. Does this not mean that in effect the amount available for the kind of research that is needed is much less than it was?

Mr Chapman: I do not know quite how you judge the scale of the problems; all I can say is that in terms of today’s monies I believe the total volume of spending on research is roughly the same today as it was pre-privatisation.

Q528 Lord Taverne: But the pressures about climate change are much greater, and the shortage of water seems to be perceived as a more serious problem. Are the problems in some ways more serious than they were, or perceived to be more serious than they were?

Dr Farrimond: I think through the 1990s the level of research investment was greater, largely stimulated by two big European directives, the Drinking Water Directive and the Wastewater Treatment Directive, and companies were investing to develop treatment processes to enable them to meet those directives. I am sure if the companies felt that there was sufficient pressure coming in the future that they would elevate research in a similar way if the need could be demonstrated.

Q529 Lord Taverne: But if the short-term requirements of the water companies are to compete does that not mitigate against spending money on strategic research?

Dr Farrimond: I think there is more and more collaboration now between the water companies and they collaborate with the research councils, for instance. UKWIR collaborates with the Drinking Water Inspectorate, the Environment Agency, Defra, the DTI, the Department for Transport and the Department of Health, for instance. They also collaborate internationally with other organisations that share our project objectives, so there is effectively a lot of collaboration that goes on.

Q530 Lord Howie of Troon: The word “research” covers a wide variety of things and I was wondering what your research is actually about. Is it to do with water quality and water treatment or is it economic research? What is it?

Dr Farrimond: The research that UKWIR does has changed from chemistry and microbiology, which was primarily the type of research we did back in the middle 1990s, and now we cover those topics plus, for instance, economic assessments of the Water Framework Directive, customer attitudes to debt, economic implications of different directives and hazardous substances in the Framework Directive and where they are found. So it is a whole raft of issues, including pipelines and the burying of service pipes, so it is much wider than ever it was in the 1990s.
Q531 Lord Howie of Troon: So it is not research in the way that an engineer such as me would understand it, it is kind of planning, looking forward at strategy and all these things. It is planning, is it not?
Dr Farrimond: The research we do is at the applied end of the spectrum, so we would take university research and try and use that and demonstrate its application in real life. So we were involved in blue sky university research but our prime interest is seeing it applied.

Q532 Lord Howie of Troon: What do these blue skies do?
Dr Farrimond: For instance developing new absorbants for chemicals.

Q533 Lord Howie of Troon: So you are back to old-fashioned research then?
Dr Farrimond: That is an example.

Q534 Baroness Sharp of Guildford: There are two questions I would like to ask. One is that obviously you were saying you are spreading your research more broadly, it is not just the chemistry and microbiology, which was the stuff of your research, and that you are now doing a lot of economic and, to some extent, social research. Picking up the point that Lord Taverne was making, when you are having to spread the research you are doing more widely and you have roughly the same amount of real resources for it, does this mean that your fundamental research, the chemistry and the microbiology, has suffered as a result of that? Secondly, can I pick you up on the European issues? You have talked about the stimulus coming in the mid-1990s from the European Directives and you have also talked about collaboration across Europe. Is there quite a lot of collaboration with other European countries and how useful is this?
Dr Farrimond: I come back to the question of chemistry and microbiology. The stimulus in the 1990s was treatment processes. If you are aware of the annual report of the Drinking Water Inspector I think that something like 99.9 something per cent of all samples meet the appropriate standards now, so there is less of a driver for that type of research because we have overcome the problems that were experienced in the 1990s in trying to meet those standards. Similarly on sewage treatment, we are now well able to meet the standards that are required, so that means less. At the moment the need is pushed very much by climate change and the Framework Directive, and that is yet to unravel in some detail.

Q535 Baroness Platt of Writtle: How effective are the arrangements for cooperation between the industry and publicly funded bodies such as government departments, the Environment Agency and the Consumer Council for Water in commissioning and carrying out research? You said that the water companies are collaborating more but how about the others?
Dr Farrimond: At the moment UKWIR has about 70 projects and half of them are in collaboration with other people, primarily government departments. The reason we like to collaborate is to establish a firm science base to establish sound science for sound regulation. If we can agree on the science we might then agree on how it can be best applied; if we disagree on the science we will have a longer time of testing it.

Q536 Baroness Platt of Writtle: Is there duplication in research commissioned or undertaken by the industry, the public sector and academia, and if there is how could it be rectified?
Dr Farrimond: We speak a lot with government departments and with Research Councils and I think there is an arrangement called the Environmental Funders Forum, of which the water companies are not a part. Maybe there needs to be some similar arrangement covering water and wastewater issues that involve government departments as well. An earlier question referred to the arrangements in Scotland where they have an organisation called SNIFFER, which stands for Scottish and Northern Ireland Forum for Environmental Research, which involves the Scottish Executive, the Scottish Environment Protection Agency, Scottish Water and Heritage Departments in Northern Ireland and the forestry organisations, so that is a model that potentially could be similarly applied to England and Wales.

Q537 Lord Lewis of Newnham: I am slightly concerned about the collaboration with government departments and even with research councils because they do not carry out research; they sponsor research and they detect areas where they want to have studies done, but they normally do not carry these things out for themselves, there is an agency which will augment this in some way or other. I am not quite clear what benefits you get from the point of view of the research itself. Is it in as much as you can then direct research into, say, academia and things like this by persuasion of the various councils, or how does it effectively take place?
Dr Farrimond: When I used the phrase collaboration I mean sharing with project funding. UKWIR operate in an open way and go out to tender for our projects, so we work with the government to organise...
a project and then find a suitable contractor to do that.

**Q538 Chairman:** As the Directives that the water industry are seeking to implement obviously come from Europe it might be appropriate for some of the research funding for resolving some of the issues to come from Europe. Are we successful in attracting EU funding and do we get as much as other countries within Europe?

**Dr Farrimond:** I understand that for the economy as a whole we do well.

**Q539 Chairman:** I am talking about water.

**Dr Farrimond:** In water we probably do less well, but, having said that, there are three projects within our programme, some involving the Water Research Centre, which are partly funded by Europe.

**Q540 Chairman:** I wonder if the Water Research Centre would comment on that also? Do you feel that we are pulling our weight on European funding on water research?

**Mr Chapman:** I think what is true of our ability to attract research from the funding councils in the UK is also true of the funding mechanisms in Europe, which is that virtually 100 per cent of that money would go into supporting academic research in university organisations and I believe that universities are relatively successful in attracting EU funding for doing research. We as an organisation on occasion manage to do so but in most cases the effort required to get through the bureaucracy and win the money means it is not worth our while doing it. The project has to be so large in order to make it worthwhile going through the effort, so I would say that at the more practical end of moving research and blue skies into applications it is actually quite difficult to get hold of EU funding, and I suspect we are not as good as other countries.

**Q541 Lord Lewis of Newnham:** Is that because the European system, as you implied, is bureaucratic, a lot of negotiations to be done and submissions, or is it that the actual returns you get are just not sufficient? There are many universities in this country who find that receiving EU money can be a slight embarrassment, in as much as the overheads are not by any means as generous as for other forms of funding. How do you find this as far as you yourselves are concerned?

**Mr Chapman:** From our point of view there is a cost to the bureaucracy, which means, as I say, that you have to get to a certain scale of project. But also in many cases the European funding, if you are not an academic institution, will only cover 50 per cent of your costs, and as WRc we receive no monies from the funding councils, we receive no government grants or support, so we find it very difficult to put together the other 50 per cent of the funding in order to justify it. In fact in some cases we have been successful in attracting EU funding but then been unable to find the industrial matching of 50 per cent in order to go through with that research, and we have had to give up the grants.

**Q542 Lord Lewis of Newnham:** My Lord Chairman, this is a very important point. It does seem to me that what we have is a situation where it is not necessarily an encouragement—it may not be a discouragement, but certainly not an encouragement—to go for this sort of money, so there is a whole area there, which I presume other Member States do not have as much difficulty in acquiring money, it is going somewhere.

**Mr Chapman:** I believe that the UK is now unique in having its national centre for water research, as we were—I am not sure we claim to be the national centre now—receiving no governmental grants or support. Every other country in Europe will provide governmental support. You could then use that money as matching funding to put in with the EU grant money, so it is a much easier task to secure EU funding, I believe.

**Q543 Chairman:** You are saying that the Water Research Centre gets no government money, whether it is from research councils, departments or other sources of funding?

**Mr Chapman:** We certainly get no grants, though we required to get through the bureaucracy and win the money means it is not worth our while doing it. The project has to be so large in order to make it worthwhile going through the effort, so I would say that at the more practical end of moving research and blue skies into applications it is actually quite difficult to get hold of EU funding, and I suspect we are not as good as other countries.

**Q544 Chairman:** You are not given core funding?

**Mr Chapman:** No.

**Q545 Lord Howie of Troon:** Do you get a lot of money from them?

**Mr Chapman:** The Environment Agency is our biggest single customer.

**Q546 Lord Howie of Troon:** What kind of proportion is it of your work?

**Mr Chapman:** By turnover, about 10 per cent.

**Q547 Baroness Sharp of Guildford:** I take it that should there be a project where you were able to bring in the Environment Agency as a co-funder that actually that would meet the terms that were required, but nevertheless you are still confronted by the same point that Lord Lewis raised, which is that the overheads granted on these EU projects are 20
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Dr Mike Farrimond, Mr Ron Chapman, Mr Dene Marshallsay,
Dr Katherine Hyde and Mr John Hart

per cent, or have they gone up now? In academia we
used to get 20 per cent.

Mr Chapman: They are trying to push them down at
the moment; there is a change going on.

Q548 Baroness Perry of Southwark: My question is
to all three organisations. What is your relationship
with the main research councils with whom you have
had dealings, and do you feel that it is an effective
relationship or would you like to see changes in the
way they operate?

Dr Hyde: Again, research monies from the research
councils is a fairly difficult path to tread for us
because the main funding councils now offer direct
funding to the universities and will not fund a
research organisation like BRE as the main
contractor. The main contractor has to be a
university and we can only gain funding for those
research projects as a sub-contractor.

Q549 Baroness Perry of Southwark: May I just
interrupt you? Is that true of all the research councils
now or just NERC?

Dr Hyde: I think of all of them, so this is somewhat
inhibitory. Consequently we have just set up the
Universities Partnership—it has just been
launched—whereby we have established some Chairs
at four universities and we are hoping to do
cooparative joint projects with those universities to
try and get over some of those barriers to gain the
funding from the research councils.

Q550 Baroness Perry of Southwark: Are those four
just in water management or are they right across
BRE’s concerns?

Dr Hyde: They are across BRE’s functions and water
would be a relatively small part of that framework.

Q551 Lord Lewis of Newnham: But did you not
undergo a major change in your funding when you
became “independent”? How much government
funding do you actually get?

Dr Hyde: Our situation is not dissimilar to WRC’s
situation; we do not see core funding at all any more
from any government departments. We have no
grants, we have to compete also for funding on
projects from the various government departments
or agencies, whether it is the Carbon Trust, Defra
or ODPM.

Dr Farrimond: In the late 1990s the EPSRC ran a
programme called WITE, Water Infrastructure
Treatment and Engineering, and this was a scheme of
about £8m, which went to universities to enable them
to carry out research identified by the water
companies. In 2000–01 we hosted workshops with all
the research councils to try to bring together
industry, academia and the research councils to
identify common projects and to seek ways forward.

One of the biggest outcomes of those two meetings
was something called the Flood Risk Management
Research Consortium, which is funded by Defra, the
Environment Agency, EPSRC, Scottish Executive
and UKWIR, and the aim of that is to develop new
technologies across the range of issues to do with
flooding. If I come back to my earlier comment about
applied research, the UKWIR money from this
project will be used to apply some of the software that
has been developed in a couple of the universities to
demonstrate it to the industries, so that it can be best
used. We probably need to repeat those workshops
again this year to move us along in the next five-
year period.

Mr Chapman: From WRc’s point of view, as we said,
we do not get funding direct from research councils;
we do work within the individual university
departments and seek to influence the research we are
doing and seek to weave it into some of the broader
projects that we are doing, so we have a transfer of
knowledge and also put some industrial steer into the
projects that we are running. We did, during the
1990s, enter into a postgraduate training partnership
with Imperial College, which we felt was very
successful from the point of view of having the
research work that was steered heavily by industry
and could therefore be translated relatively quickly
into applicable science and engineering, and also
produced some very fine graduates, a number of
whom we have since made employees of WRc. Again,
a bit like the story earlier, it was not commercially
viable for us to continue with that because the vast
bulk of the funding went to the university and we
were allowed just a very small amount of funding for
the administration and really nothing at all to cover
our costs, and as a commercial organisation we could
not support that and had to withdraw from that
arrangement. I think it was a mechanism that
produced some very good work and if there was a
way of reducing the bureaucracy involved in running
something like that I would be very keen to see that
started again.

Q552 Lord Lewis of Newnham: Has the course
closed then?

Mr Chapman: Yes, it has.

Baroness Perry of Southwark: We do understand that
NERC has just proposed some funding changes on
key research activities. Will those changes hinder the
ability of the UK to respond effectively to existing
and future regulations?

Q553 Chairman: I think this specifically refers to the
Centre for Ecology and Hydrology, CEH.
Dr Farrimond: I cannot comment on that; all I can say is I think that the reductions in the NERC LOCAR Programme are very concerning. That programme was funded three years ago to monitor interactions between surface water and ground water in several catchments and that funding had been stopped after just three years, but these interactions are very long-term and need long-term monitoring to enable us to establish the right relationship. So understanding has not developed sufficiently in that short period.

Q554 Chairman: There is a discussion period going on with NERC but they have announced their proposals which, on the base of it, appear to impact quite heavily on numbers of staff; 40 per cent of the staff at the Centre of Ecology and Hydrology will lose their posts, so that does, on the face of it, appear to have quite wide implications. Whether that is for water remains to be seen.

Dr Farrimond: I suspect it will have a greater impact on the Environment Agency’s activities than the water companies.

Q555 Lord Lewis of Newnham: My Lord Chairman, could I just ask this? You implied—and I do not want to put words in your mouth—that you were saying that your own research had to be relatively short-term, that the big projects for the future were ones that you could not address. Is this a very successful way of dealing with this problem? It does seem to me that there ought to be some overall strategy of really looking at problems. As our Chairman pointed out at the very beginning, there are many of these problems which have long-term implications and unless you get into them—all right, we may be able to borrow ideas from Europe—it does not seem to me to be a very satisfactory arrangement.

Dr Farrimond: I think when budgets are restricted then there is always a greater focus on short-term research than long-term research. Having said that, we are now in the twelfth year of a project which is looking at the recycling of biosolids for land. So we have been funding that project with Defra since 1994. We are just starting long-term projects looking at the condition and location of the buried utility assets and have been reasonably successful in generating collaborative projects both in Europe and with the EPSRC and the DTI, but this is long-term research. Those projects are each three to four years long and we will need successive projects to see them through to a successful conclusion.

Q556 Lord Taverne: How does the Centre work with the water industry to undertake research on the latter’s behalf? Dr Farrimond has described it as a coordinating role but is there something the water industry can help with that you do not get from other sources, namely the commercial problems which you have mentioned that you do not get funding for? Is that something you could get support for in the industry? The other question is how far has privatisation had an impact on you being able to carry out some more strategic studies?

Mr Chapman: Prior to privatisation the Water Research Centre, as it was, was funded by a levy on the water industry, which was gathered and guaranteed and then WRc spent it on behalf of the water industry. I am not here to defend the efficiency of that arrangement but it did mean that most of the money went through one place and there was one place where people could take a long-term view. The industry has now, I believe, spent about the same amount of money but only about one-tenth of that money would arrive at the WRc and the rest is spent across a number of other research contractors and in some degree across companies’ in-house departments, and a large chunk of it would go to the UKWIR programme that Dr Farrimond heads. I believe, that despite the best efforts of Dr Farrimond and the efforts of the industry to collaborate, we have undoubtedly lost the ability to take a longer-term view on key areas of research and I would like to see longer-term projects funded in that respect. I think that there is a role for government in some form to take a policy lead and to provide at least some level of funding to ensure that some of these longer-term programmes could actually be set up and kept running.

Q557 Lord Taverne: What has the experience of the Building Research Establishment been since the sale? Has that been similar?

Dr Hyde: In general I would say yes, I think that is true. We are very much dependent on where our contract monies are coming from at any one time and to some extent we are driven by projects which are designed to look at government policy, but of course that is normally fairly short-term and the projects will complete within, at the most, two years. So I would say that that would be the normal pattern of funding now.

Dr Farrimond: I think the water industry made a decision to break with WRc, in the early 1990s because the range of research it wanted to do was beyond the capabilities of any one organisation; an example I mentioned earlier, from chemistry and microbiology to a much wider range of research. The view taken at the time was that it was unlikely that any one organisation could fulfil all those needs, so we operate in a competitive market looking for best value research.
Q558 Lord Whitty: Could we be a bit more specific about the type of research you are carrying out? You have talked in broad terms about climate change and potential water shortages, but what kind of research are you carrying out in those areas which would be at its end point useful for averting a water crisis? Do you think that research here could benefit from some of the experience in other European countries?

Dr Farrimond: My personal view is that any climate change we experience then someone in the world will already be living in that climate, so clearly we have things we can learn from those people. We are funding a lot of work on water efficiency, and some of it with WRc that Mr Chapman will explain to you, I am sure. The problem we have with water efficiency advice is that there is not a base of hard evidence yet which is reliable enough to make hard, solid recommendations one way or another. There are some clear things that could be done and there are some which still need further study to derive benefits.

Q559 Lord Whitty: Examples?

Dr Farrimond: I think one of the clear winners might be something like dual flush devices, which could be fitted quickly to toilets. Control of water flushing in urinals gives quick returns. Research has been done by Mr Marshallsay at WRc who is in a better position, I suspect, than I am to tell you about it.

Mr Marshallsay: Yes, if I could take over. Some of the research we have been carrying out looking at water shortages in particular is really focused on the areas of how we use water in the home, which leads us on to looking at water efficiency measures and devices, and also looking at leakage and domestic metering. If we look at how we use water in the home, a lot of work has been done with the water companies—and this is research sponsored directly by the water companies—in looking at measuring and quantifying what we call micro components of water use: that is how many times a day somebody uses an appliance like a toilet, dishwasher, washing machine, and what volumes per use they use. We can use that information to help them forecast demand into the future; and to look at different scenarios of the impact of legislation like building regulations or changes in technology. To support that—and as Mike Farrimond mentioned just now—we have been doing a study for UKWIR where we have been trying to gather all the evidence together into one place on how effective these water efficiency measures are. One of the challenges here is that a lot of this research on water efficiency measures is carried out within each water company and by small groups of people who probably, it is fair to say, are under-funded to achieve some of the goals which they aspire to meet, but nevertheless produce a lot of data of very good quality. The project that UKWIR commissioned aimed to try and gather that data together and to analyse it in a consistent way, and we have been doing that over the last year, putting together the information on about 45 different projects, putting that data into a database which is now online so that the companies can go in and add further data to it, and this will in the future allow us to have a much more robust body of evidence upon which we can make decisions in terms of cost effectiveness of these different measures. We need to gather that evidence because there are quite often conflicting stories coming from some of these projects, so that you get different ranges of benefits, different ranges of the cost of implementation and we need to pull that information together so that we can look at the ranges. The other areas in which we have been working is looking at affordability, which is another area which impacts on water efficiency. We have just started a project for Defra, which is at the pilot stage in the south-west of England, looking at the issue of affordability of water and how water efficiency measures may impact affordability. That is one example of a fairly long-term study—and for my group a long-term study is something over a year, not three to four years. This has just started and we will gather evidence from several thousand properties in the south-west region looking at the potential impacts on affordability of these measures. On the other side of the water supply balance we have been looking at leakage and how you tackle leakage, which has been successfully driven down in England and Wales over the last 15 years.

Q560 Chairman: Rather unevenly, surely?

Mr Marshallsay: Rather unevenly but different areas have different problems. If we look at the infrastructure position in central London compared to that in East Anglia conditions are very different in terms of ground conditions, weather conditions and pipe materials. It is probably true to say that the UK water industry has led the way in terms of leakage reduction and tackling quite a challenging problem. One of the areas we are looking at at the moment is what are the impacts of actually replacing some of those pipes in the ground and if we replace the pipes how much do we reduce the leakage? In an ideal world that would be zero but because of the length of pipes involved and the difficulties of working in ground conditions you inevitably get some leakage and some knock-on leakage potentially in other areas. In terms of climate change, which was part of the question, we do not actually do a lot of direct work on climate change, we leave that mostly to others like the CEH; what we do try to do is to take note of the results coming out of that research and try to apply it or comment on it in the research that we are doing. So we have recently carried out a project,
again for UKWIR, looking at the impact of seasonal weather on leakage and ground movement and it is very clear that short, dry cold snaps in the middle of winter lead to a peak of mains bursts and leakage. Climate change is going to result in more peaky weather, colder winters, more rapid cold snaps and that may itself have an impact on our ability to control leakage compared to how we do it at the moment.

Mr Marshallsay: Indeed it does, but we have over 21 million homes in England and Wales with bathroom suites ranging from brand new to over 20 years old, very clear that short, dry cold snaps in the middle of winter lead to a peak of mains bursts and leakage. and the regulations that were in place 20 years ago are very different. Climate change is going to result in more peaky weather, colder winters, more rapid cold snaps and that may itself have an impact on our ability to control leakage compared to how we do it at the moment.

Q561 Lord Howie of Troon: You mentioned domestic efficiency, toilet flushing and things of that sort. How significant is domestic water saving compared to leakage and savings in industrial use?

Mr Marshallsay: If you look at the water balance, how much water is put into the supply system in England and Wales, 52 or 53 per cent of the water that goes into the supply goes into domestic properties; about a further 22 per cent into commercial premises; and between 15 to 20 per cent on leakage. So domestic consumption is a major component of water balance and therefore is a major target for water efficiency. On the commercial premises, which are made up not only of industrial use, factories, farming, but also commercial properties’ use—a building like this, public buildings and all the high street premises, for example. So a very diverse set of users targeting water efficiency does bring its rewards in terms of the industrial sector, but a lot of that is driven by pricing, because of course the commercial sector pay for their water by volume and for a large water user, a car manufacturing plant, for example, there will be very strong incentives for them to invest in water efficiency on their own behalf and pay for those savings through the savings they make in their water bill.

Q562 Lord Howie of Troon: But domestic use is quite significant.

Mr Marshallsay: Domestic use is very significant and if you look at the way we use water in the home on average about one-third of it is flushed down the toilet, so this is why we are looking at toilet devices, such as cisterns’ displacement devices, where you put a brick in the cistern, for example, or retro-fit devices that change the volume and flush or dual flush toilets, and looking at pushing technology to deliver ultra low flush toilets will have a big impact.

Lord Howie of Troon: We could solve the problem by going back to dry closets, could we not?

Q563 Chairman: If I could just interrupt to ask, is it not odd that one of the solutions to flushing too much water down a lavatory is to put a brick in the cistern? Does it not suggest that the cistern is the wrong measurement in the first place?

Mr Marshallsay: Indeed it does, but we have over 21 million homes in England and Wales with bathroom suites ranging from brand new to over 20 years old, and the regulations that were in place 20 years ago are very different.

Q564 Chairman: You would not think it necessary to put a brick in a new cistern?

Mr Marshallsay: Exactly. If you look at the cistern sizes they have reduced from 12 litres to nine litres and they are currently six litres, so certainly you would not put a displacement device in a modern six litre flush cistern.

Q565 Chairman: I think Dr Farrimond wanted to come back.

Dr Farrimond: I just wanted to add a little about research in domestic properties. We think it is more than just technology so we are funding a project at Lancaster University in the Department of Sociology to look at the cultural issues behind what it is. You can put all these devices in the home but will people adapt to them or will they still have the same habits, so will we actually move forward? So we need to understand that better as well, as well as understanding the mechanics.

Chairman: I think that brings us on to changing people’s lifestyles via metering, and Lord Broers has a question on that.

Q566 Lord Broers: Are you in favour of the introduction of compulsory metering for domestic customers, whether in water-stressed areas or on a wider basis?

Dr Farrimond: I think in the past in drought periods voluntary short-term restrictions have helped effectively to reduce demand. I think in the long-term the way to control demand is through metering.

Q567 Lord Broers: What about remote metering and smart meters; do you think they are feasible, are they too expensive, are they reliable?

Dr Farrimond: We have just completed a study that is yet to be published which shows that domestic metering in the UK reduces per capita consumption between 10 and 12 per cent. Other studies in the States have shown that tariff management can reduce it further, by possibly another 10 per cent. Smart metering potentially gives the option to combine the two things: to gather data from meters at any point in the day and to change tariff structures as well, and we are just negotiating with a research foundation in the States to start a project on smart metering in the next six months, which will take probably two years, just to get the technology and the options for the future.
Q568 Lord Taverne: I did not quite hear you. Did you say that you were not in favour of compulsory metering?
Dr Farrimond: Yes, we are.

Q569 Chairman: Why are you going to the States for collaboration on this smart metering? Is it because they are ahead of you?
Dr Farrimond: Their smart metering technology is probably in advance of ours and, to be honest, the American Group is willing to put more money into the project than we are, so by joining them we get a bigger bang for the bucks.

Q570 Lord Howie of Troon: What does a smart meter do that an “un-smart” meter does not do?
Dr Farrimond: It enables you to pick up readings without entering the property. We can pick up readings at different points of the day, with shorter time periods so we do not need to go in every six months, you just have a snapshot of consumption; you can have a better picture of consumption through the day, through the week.
Chairman: And it allows you to price the tariffs according to peak demand.

Q571 Lord Howie of Troon: So you would use this to structure your pricing programme, would you?
Dr Farrimond: Potentially.

Q572 Lord Howie of Troon: That is the notion?
Dr Hyde: At BRE we have been doing some work for Defra for one of the programmes looking at market transformation, and we have collected some perhaps slightly alternative information to that on the projects that Dr Farrimond has been working on. We have found that there is not always a direct relationship between metering and water efficiency and that in fact, as has already been mentioned, consumer behaviour is a critical factor in the process. Consequently, we have seen some diverse relationships, say in the Severn Trent area where in fact they cannot demonstrate a direct relationship between the implementation of metering and the reduction in the water used per capita consumption. So there is a diversity of view here and we feel that the consumers need to be better informed and have education programmes, and that perhaps metering is important from the point of view of informing behaviour, but that it may not be the only means of informing behaviour.
Mr Marshallsay: Could I add a comment? When we talk about metering and compulsory metering, of course we already have an element of compulsory metering on a selective basis for a new property. All new properties must be metered in England and Wales and there are several companies at the moment who are compulsorily metering on change of occupancy. I think one of the problems in this area is that a lot of the historical data is based on different metering policies. For a long time we had meter-opts, these are people who could opt to have a meter, and the underlying drive for them to save water is to save money, and all that creates some conflicting evidence. But I would support Mike Farrimond on this in that when you look at all the evidence there is a general leaning towards the fact that metering does have an impact on demand, particularly during peak periods. Of course, when you talk about metering you cannot talk about metering and demand management without talking about the other ways in which we pay for water, and that brings in issues like affordability and debt. On the one hand you might use rising block tariffs, sophisticated tariffs to price up water during peak demand periods and therefore hope to reduce water use, without considering the effect that that may have on those vulnerable groups that may find it difficult to afford water. So tariffs might be able to provide an answer to both of those challenges, but that does then lead you on necessarily to having what I would term “intelligent meters” that can collect data, as Dr Farrimond has already said, at different times of day and aggregate those on so that you can have some sophisticated charging mechanisms.

Q573 Lord Lewis of Newnham: But is there not a very important point here? You are implying—and I think it is what Dr Hyde is also saying—that metering is all very well but unless it is actually apparent to the people who are using it it is not going to be much use. It is all very well putting a compulsory meter in a house but if you put it in such a position that nobody ever looks at the thing or becomes aware of it then there is no sense in it whatsoever, as far as I am concerned. All right, it may reduce occasionally but I think in general terms there is a degree of education here to the user of the actual thing, and I think this is the sort of thing that certainly Lord Broers believes in very strongly, that it has to be evident and it has to be apparent so that people then get into the habit of actually looking at it and thinking about it and that will then lead them—perhaps for the wrong reason, which I believe to be saving money—to the reason why they would start getting very interested in it.
Mr Hart: I think on the whole that households with meters tend to think more about water efficiency than those without meters and they tend to take on more water efficient behaviours. But you are quite right that it would also suggest that they do not actually read the meter, they are not very interested in the meter itself—the bill comes at the end of the period,
as it does with any other bill and that is paid. But the participants in studies have certainly indicated that they would like the meter to be outside and read so that they were not involved in having to be at home for the meter to be read. Smart meters may help the demand management but I do not think people are any more interested in a smart meter in terms of how they use their water.

Q574 Lord Broers: It would depend on the price, surely. If you had a meter on your kitchen wall that turned red as the price doubled and then orange when it trebled I think people would soon take an interest in it.

Mr Marshallsay: I think there has been some previous research which has demonstrated that, but you do not necessarily need smart or intelligent metering to achieve that. If you look at the way that water is charged for in Nicosia, in Cyprus, they manually read their meters, manually read them every two months, but they present their customers with their bill using a rising block tariff system which presents very clearly to the consumer how much money they have spent on each band of the tariff, so they can very easily look back—albeit over quite a long timeframe of six months—at how they have used the water over the last six months and how they can save money. I think what intelligent metering could do is to speed up that process. There are very good reasons for having the meter at the end of the garden because it does then alert you to the presence of potential leaks on your service pipe that you are running from the main to your property. An intelligent meter will also allow you then to have a reader in the house which can do a number of things, from changing colour to giving you precise the details of your bill or the rate you are paying for water at that particular moment in time. So I think gathering evidence on the effectiveness of that and how much that is going to cost and the benefit it brings is very important.

Lord Broers: I imagine most of those meters are just mechanical, impeller-driven meters, are they? They are not powered in any way?

Mr Marshallsay: No, you are right. Most of the meters in place are mechanical, although we are seeing now a number of manufacturers bringing in new technology which is effectively able to piggyback on top of the mechanical meters but also manufacturers are developing state of the art electronic meters which are taking advantage of longer battery life, so you have got a meter with a potential battery life of 10 years that is using ultrasonic or electromagnetic technology.

Lord Broers: You could charge the battery with the water flow.

Chairman: This is becoming a circular argument.

Q575 Lord Howie of Troon: I have a meter and I do not pay any attention to it. What I am really wondering is this: why should water cost a different amount at different parts of the day? It is only water and it is presumably produced in the same way all day, so why does it cost more at different times of the day under your intelligent system?

Mr Marshallsay: It depends very much on what the constraints of the system are. Some companies find it very difficult to get enough water through the system at certain peak periods of the day or, more commonly, a seasonal peak, for example summer, where you might wish to increase the tariff when water is in short supply.

Q576 Lord Howie of Troon: When people want water, you charge more for it.

Mr Marshallsay: Yes, they are using that water on a discretionary basis.

Q577 Lord Howie of Troon: I am not sure about that.

Mr Marshallsay: It depends on the point of view, but you do not want to limit that part of water being delivered which is maintaining health and sanitation.

Chairman: I think we must move on from meters.

Q578 Lord Lewis of Newnham: We are at a stage at the moment, if we believe government policy, where there is going to be major development in new housing throughout the country. We are interested to know exactly how you view the water-saving devices that could be employed in-house because obviously there is an opportunity here for introducing these into new housing. How effective are they, and what sort of features would you like to see being installed into new houses?

Mr Marshallsay: Yes, there is a whole range of devices which can be used. We have talked about some of these already: low-flush toilets, dual-flush toilets, flow-restricting devices which you can put into taps, low-flow showers, and there are more fundamental things like taking showers as opposed to baths. Typically a shower will use something like 25 or 26 litres of water whereas typically a bath uses somewhere between 65 to 80 litres of water.

Q579 Lord Lewis of Newnham: What if it is a power shower?

Mr Marshallsay: A power shower is different. Potentially, that will use similar volumes to a bath. I come back to looking at how we use water in the home. As I said earlier, about a third of it is going on toilet use; about 25 per cent of it on internal tap uses for things like cooking, drinking, washing, hand-washing; and baths account for about 14 per cent. Tackling baths is another area you can go for,
although you can only reduce a bath to a certain size before it becomes impossible to take a bath. I think it has to be said that washing machines use about 12 per cent. With washing machines, water efficiency has improved over the years which is probably largely driven by improvements in technology to achieve lower energy ratings. We have a whole range of devices that can be used and most of them are effective. You have got water butts of course, which are quite common. They will only be effective during peak periods (a) when you have enough water in them and (b) when you want to use that water for watering plants. Most of the other systems reduce water use throughout the year. On top of that, you have then got grey water re-use devices and rain-harvesting devices which are more complex, more expensive and cost more to maintain. Those are probably unlikely to be used in individual households on a large scale. They are probably more likely to be used in groups of dwellings or larger commercial buildings. In terms of targeting, as I said, if you can produce a toilet which uses very low flushing, then that would be a major step forward, although you have to consider that it performs a function in terms of health and sanitation, so you cannot lose sight of that fact. There is a major research project going on, coming to a close in fact, led by Imperial College called WaND, which I think has an input from a wide number of people in the industry. One of the products they have been looking at is developing a toilet which flushes at about one and a half litres. In fact, we will be installing two of those units in our premises in Swindon in the next month to see how they perform. That sort of technology, although not here yet, might have a future in terms of having an impact on water use in the home.

**Q580 Baroness Sharp of Guildford:** You have not mentioned garden hoses. What proportion of garden hoses is used?

**Mr Marshallsay:** What we find with garden hoses is that during the period from, say, October through to March, they are used only a small percentage, particularly washing cars, that sort of thing. Where we monitor homes and look at their increase in use during peak summer periods when it is hot and dry, then the majority of the increase in use is attributed to external use, and this is garden watering, sprinklers, filling paddling pools, et cetera. Targeting garden hoses and watering is very effective during peak periods and less effective on an annual average.

**Baroness Sharp of Guildford:** Yes, obviously.

**Q581 Lord Whitty:** In addition to bringing these improvements in energy efficiency through building regulations or with other regulatory means, we also have a draft Code for Sustainable Homes at the moment. How far do you think that goes in this direction, and should that kind of Code be mandatory in your view?

**Dr Hyde:** BRE broadly welcomes the Code and in many ways I think we see that the Code is broadly based on the EcoHomes system. EcoHomes have had a gradual take-up in the marketplace: slowly with private homes, but we would expect the take-up with a non-mandatory code to be rather similar, to have a fairly slow take-up in the marketplace. The Code is still out in consultation at the moment and so I have been asked to be perhaps slightly restrained in this respect simply because obviously it is the BRE system that is very close in formula to the way in which the Code has been proposed.

**Q582 Lord Whitty:** How long has the EcoHomes standard been out? I know it is required in the public sector, Housing Corporation and English Partnerships as well. What proportion of take-up outside the area that is effectively mandatory have you seen of the EcoHomes standard, ones by private developers entirely?

**Dr Hyde:** The first system was BREAM and that was set up in around 1994. EcoHomes followed in 1998, I believe. The non-mandatory take-up is fairly small.

**Q583 Lord Whitty:** About one per cent or 30 per cent?

**Dr Hyde:** I would suggest around one to two per cent and obviously private developers are more likely to adopt the EcoHomes code for social housing for which the Housing Corporation has requirements and similarly, as I am sure you are aware, the English Partnerships have a requirement also for compliance with an EcoHomes standard on properties built on land from English Partnerships.

**Q584 Lord Whitty:** Given the take-up elsewhere is less than two per cent and the Code would be roughly the same standards, and at the moment there is no mandatory provision, would it be stretching your instructions to say that to be more mandatory might be helpful?

**Dr Hyde:** I think that we would welcome a rapid approach to a higher percentage and a higher proportion of implementation.

**Lord Taverne:** The answer is yes?

**Q585 Baroness Platt of Writtle:** What is your opinion of the water efficiency aspects of the Government’s response to Kate Barker’s Review of Housing Supply? Are there additional water efficiency measures that could have been included or should?
Dr Hyde: There is quite a number of things that we feel is very positive about the Government’s response, but one particularly positive comment in the response, is the commitment to regulate to achieve water efficiency savings. There are other very important elements in that paper, including the requirement to bring infrastructure considerations to the front of the development process. I know from the sectoral viewpoint of developers and construction companies that would be likely to be welcomed because it would give a clearer path forward for identifying developments that are, let us say, sustainable and for which the planning requirements are going to be clear. Again, there are some aspects of the response which may tend to suggest perhaps the lower rate of take-up.

Q586 Chairman: Are you satisfied that the response to the Kate Barker Review has taken into account that more houses inevitably means more water consumption even though the population may not change?
Mr Marshallsay: I will say a bit on that. It will impact upon water consumption overall. We know there is a well-established relationship between occupancy in dwellings and per capita consumption, so as the number of occupants in a dwelling increases, the amount of water they use per head decreases. If you have a unit of three people living in one building and take them out and put them into three buildings, their use will increase. We are faced with a lot of new developments proposed being sort of higher density, lower occupancy buildings. There will be a need to try and constrain growth in PCC (per capita consumption) and many of the decisions put forward in a response were focused around the Code on Sustainable Buildings and building regulations. There are changes being proposed that we are involved with. ODPM are looking at potential changes to building regulations to bring water conservation into those building regulations for new properties but also for existing properties. We can chip away at new properties and reduce water consumption in those, but if we can also do something with the existing properties, then that will help the overall situation in a particular area. We need to consider both the water efficiency side and also the need for having enough resources at the right time of the year in these areas to cope with the change in demand. We are inevitably going to have a twin-track approach in these areas, ensuring there is enough source and resources available but also doing what can be done to reduce consumption.

Q587 Lord Lewis of Newnham: Can we turn to experience in other countries. I understand that green roofs and other storm water management systems are quite often practised, for example in Germany. Why are these systems not more frequently used in this country? Is this a matter of social acceptability or what?
Dr Hyde: We have looked at the general situation and it does appear that there are fiscal incentives there, particular incentives to people in the take-up of the rain water harvesting tanks. There is a different price for water in Germany and it does appear that they are able to meet some of the infrastructure requirements in terms of flushing out of these tanks where, at the moment, in the UK there is perhaps a slightly greater difficulty in terms of flushing connections into the public sewer. Regarding green roofs, there are issues about green roofs where one has to look at them in terms of sustainability very carefully because a large proportion of water that is retained on a green roof is not then available or it may not be available to go into a rain water harvesting system. If you want to look at a means of promoting greater capture of rain water for re-use, and that is our primary objective, then one might say, in general, green roofs may serve perhaps not that same functional purpose, there may be specific circumstances where one might desire a green roof for external characteristics but it is considered that the other benefits of green roofs are perhaps more marginal, biodiversity and those sorts of issues.

Q588 Lord Taverne: Are you saying that there are more important things than the green roofs and that is not something we ought to be looking at as seriously as some suggest?
Dr Hyde: I think one has to make a balanced decision on sustainability. If, for example, we look at a water deficient area like Folkestone and Dover or the south east of England where we are moving towards a greater demand on our water resources, then one might make a different decision from a decision that is made where there is an area that is abundant in water supply.
Chairman: It is appropriate in certain places. Baroness Perry?

Q589 Baroness Perry of Southwark: Yes, I think my question is for the Water Research Centre. In several of your reports you said that certain aspects of the Water Framework Directive, particularly the daughter Directive on priority substances, may not be achievable. The cost, you suggest, could be prohibitive. Why do you say that? How did you reach those conclusions? Allied to that, can you also tell us what you think might be done to make it more realistic and more affordable?
Mr Chapman: I think some of what might have been done has already been done. Comments were made in relation to some of the earlier drafts and early
thinking and we are still awaiting the publication of
the draft daughter Directive. Through the efforts of
various organisations, including our own reports, I
think we have now moved to a position where we
would be more comfortable with some things that we
hope will be proposed but we wait to see what
actually is produced. We have particular concerns
about recognising the intrinsic background levels of
certain priority substances, the fact that some of the
substances might, for historic deposits, be trapped
into sediments, et cetera, and be taking a length of
time. We are also particularly concerned about the
lack of a de minimis level for point discharges and a
lack of recognition of some kind of a mixing zone, if
you like, which has been commonly applied in the
UK in the past. We are hopeful that the draft, when
we next see it, will have recognised some of these
considerations and that we will have put in place mechanisms
that we suggested. We will wait to see what
is published. There is always a further review and
further priority substances to be added. I think it is
something we need to keep an eye on for some time.

Q590 Baroness Perry of Southwark: Does your hope
for improvement include your concerns about the
end of pipe treatment which you say would give rise
to considerable additional environmental costs,
carbon emissions?
Mr Chapman: Depending where the levels end up, we
may end up with costs if they come up with a
standard that is lower than the one that is currently
applied, at one point in the draft there were to be no
de minimis amounts, effectively there were to be no
measurable contaminants whereas we hope the
future draft will include some recognition of some
low levels that will be acceptable.
Dr Farrimond: The WRc are part of a consortium
that carried out a project for UKWIR and the
Environment Agency looking at the sources of these
priority hazardous substances. I think early thinking
from the Commission was that expenditure on
effluents would be the best way of solving the
problem. It is quite clear from the work we have done
that a lot of these chemicals are present in sewage, but
some are not, and the cost estimated at the time for
improving that was around £6 billion, and that would
not have removed all the chemicals from the
environment. We are currently carrying out a project
in collaboration with Defra looking at alternative
ways of removing some of these chemicals from the
environment. Some of them will have to be removed
at source and some of them will have to be taken out
of the product and substituted. It is not one answer,
there are a range of answers to solving this.

Q591 Lord Taverne: I am very worried about this
Priority Substances Directive. It does seem to me that
the European Commission, or whoever advised them
or the Council, was being ultra cautious and totally
counter-productive in the standards they are setting.
I hope whatever representations you make will be
sufficiently robust when they are looked at in a much
more realistic light than has happened in the past. I
hope that is your attitude too.
Dr Farrimond: We will ensure these reports are on the
appropriate desk in Brussels as soon as we can.
Chairman: The qualified assurances you have been
able to give are not shared by some of the people who
have given us evidence, particularly the water
companies, who still feel there is much concern that
the Directive might not act in the more pragmatic
approach that you are encouraging. As you say, it
remains to be seen how the final directive is framed.

Q592 Lord Lewis of Newnham: Do you feel that in
this sort of response this country is unique or have
you got favourable attitudes in the rest of Europe? It
seems to me the Commission seems, in many ways, to
be imposing something here which is not generally
accepted in this country. Are we unique in that
respect?
Dr Farrimond: In some ways, yes because we are a
densely populated island. Our rivers are small and
short so most things from our rivers are in the sea
within five days. Holland is a small densely populated
country but it has much bigger risk because rivers
flow from other countries so in some ways we are
unique.
Chairman: I am afraid we have run out of time, in
fact, we have rather exceeded the time which we
would normally devote to witnesses but there are five
of you and you all have much expertise to share with
us. Thank you very much for doing that. If there is
anything further that you feel we skipped over rather
too lightly and you would like to follow up, please do
send in further information if you feel that would be
helpful. Thank you again to all of you for your help.
Supplementary Evidence by WRc plc

1. “What role could changes to Part G/H of the building regulations play in water efficiency? What requirements should be included?”

Part H (Drainage and Waste Disposal) does not address water efficiency at all. Part G currently has no requirement for the conservation of water, there are three requirements only:

- G1 refers to adequate sanitary conveniences with suitable installation for hot and cold water to washbasins;
- G2 refers to need for a bathroom with bath or shower with suitable installation for hot and cold water to bath/shower;
- G3 refers to safety of unvented heating systems.

So currently the only regulations that address the issue of water efficiency are the Water Supply (Water Fittings) Regulations, which cover those buildings supplied from the public water supply only. They deal with “waste” of water but not the “conservation” of water.

We are presently working for the ODPM to investigate whether including provisions within the Requirements of Part G of the Building Regulations can enhance the conservation of water. We have made proposals to include water conservation measures in future regulations for new buildings and where notified building work is carried out on existing buildings. These proposals cover both domestic and non-domestic properties and include the use of water efficient fixed appliances and rain water recycling systems.

2. “How can we educate developers, builders and homebuyers about the benefits of water efficient devices?”

Developers and builders should be presented with a clear and consistent message regarding the use of water efficient devices and the benefits that will accrue from the use of these devices, whether the message comes through regulation, planning or from other groups. Benefits not only include saving water, but for new properties (which have to be metered) there will be ongoing savings to homebuyers through reduced water charges.

Developers and builders also operate in a commercial environment, so they need to be able to address the potential conflict between the need for water efficiency and the demands of the market and consumers, for example, addressing the “desire” for power showers against the needs to save water. Developers will also need to be re-assured that the costs of installing water-efficient products would have to be no more than the current products they buy.

Developers, builders and plumbers are very important to the success or failure of any initiative or policy to accelerate the uptake of water efficient devices. They face the commercial and market pressures first hand, and I suggest that the committee should consider hearing evidence directly from these groups.

Educating homebuyers probably starts with raising awareness of the value of water as a resource essential to health. Many schools now include the importance in water in the curriculum and the water industry actively supports this education, and this will raise awareness in the longer term. Educating current homebuyers probably comes back to providing a clear and consistent message, again the water industry provides information to its customers about water conservation. I believe that the Water Saving Group and Waterwise will also be addressing this issue in some detail.

3. “How adequate is the Code for Sustainable Homes? WWF feel that it is less taxing than EcoHomes and (in some cases) the existing building regulations.”

As mentioned above, the existing Building Regulations do not include provisions for water conservation. Therefore the proposed Code should improve the situation. This will, however, depend on how the Code is implemented. The Code will only apply to new homes (not existing homes or the refurbishment of existing properties) on a voluntary of mandatory basis.

The proposed Code is based on the EcoHomes scheme and the impact on water conservation will depend on exactly how the targets are set within the Code. We have some specific reservations on how the targets for water efficiency are set within the proposed Code and will be putting these forward to ODPM through the consultation process.
The technologies for leak detection and location are developing all the time; examples of some of the latest technologies include the Sahara system for trunk mains leak location, digital leak noise correlators, multi-correlator systems and acoustic logging. As these systems are developed they are evaluated by the industry to identify their strengths and weaknesses and added to the leakage tool kit as appropriate.

The list of technologies also includes making use of the latest advances in IT, geographic data systems, communication systems and business processes. Water companies in the UK are applying these technologies to improve the efficiency with which leaks are identified, located and then repaired.

To maintain the reduction in leakage levels that have been achieved in the last ten years the industry needs to have the right people as well as the right technology. There are some good examples of how companies are developing staff, improving training and making use of technology to enable initiatives like mobile working to reduce response times.

January 2006

Examination of Witnesses

Witness: Mr Phil Burnell, Programme Manager, Infrastructure and Environment, Engineering and Physical Sciences Research Council, examined.

Q593 Chairman: Can I welcome Mr Burnell. I am sorry you have been kept waiting but you have benefited, as we have, from the evidence of the earlier witnesses. Would you like to introduce yourself and just say a quick word about the role of the EPSRC in matters to do with water research?

Mr Burnell: I am Phil Burnell. I am the Manager of the Infrastructure and Environment Programme within the Engineering and Physical Sciences Research Council. That is one of three components of the engineering programme and it is a managed programme in the sense that it commissions research strategically and generally in the area of the infrastructure of the environment. I should mention at this stage that it has just been re-organised to reflect increasing emphasis on energy related research and climate change and those two areas are now a separate programme. My responsibilities now are essentially around the urban environment, the community environment, including water management.

Q594 Chairman: Can you give us a flavour of how you determine the priorities for work to be funded by your research council in water research and whether you are satisfied that the funding which you are able to put into this area at the moment is adequate for the national requirements?

Mr Burnell: The process by which research priorities and strategies are determined for this area are essentially the same as for the council as a whole. We engage in continuing and permanent rounds of consultations with stakeholders, essentially research providers and those who use the outcomes and the results of research. Every two years programme managers, such as myself, prepare business plans for the programmes for which we are responsible. These are submitted to advisory panels which advise our council, the Technical Opportunities Panel and the User Panel. The Technical Opportunities Panel is essentially composed of academics; the User Panel is essentially composed of representatives from industry and commerce. Based on the business plans from the team programme managers those two panels prepare advice to be submitted to the council. The council looks at those recommendations, usually first in October and then again in December. As a result of that, we will then set the budgets and the programmes for those individual programmes commencing the following financial year with budgets set relatively firmly over the next two years.

Q595 Chairman: If a research group came up with a proposal which was outside the remit of those panels, they would not stand much chance of being funded then?

Mr Burnell: Yes, in two ways. If it was part of the consultation process then an idea can be factored in. My responsibility as programme manager is to test the quality of that idea more widely and I would do that through a variety of means. For example, each programme has a strategic advisory team, a small group of people that we talk to on a regular basis to gain advice. If it were a responsive mode proposal then it would go through the main engineering programme. There is no responsive mode funding available through my programme. It is all strategic through calls and that kind of mechanism. That idea could be funded through the responsive modes.

Q596 Lord Broers: How do EPSRC's research strategy and priorities align with Government policy and do you have a problem with short-termism and the ability to fund longer term blue sky research?
Mr Burnell: In the case of the Infrastructure Environment Programme, I guess EPSRC as a whole, there is a sense in which our research strategy does align very directly with government policy if we receive a sum of money through the spending review which has a definite label on it and the Energy Research Programme is perhaps an excellent case in point. We have to invest that money in energy research because they are the conditions on which the money has been given to us.

Q597 Lord Taverne: What proportion is that?
Mr Burnell: It is very small as a percentage of the total. I think the strength of the UK system has been, for many years, that money has not come down from government with very firm labels attached to it. It is still a very small proportion of the overall budget. What aligns us with government policy is that we have very close interactions and regular meetings with government departments. The research we encourage and eventually fund will be through the contacts with those departments through whom we will influence policy and practice through research which has been funded, and also be able to shape and mould the calls that we put out in terms of what the requirements are in those departments.

Q598 Baroness Sharp of Guildford: How effective do you think your relationship with the water industry and the other major stakeholders, such as the Environment Agency and Natural England, is?
Mr Burnell: At the moment my view is that they are very effective. You heard earlier from the other witnesses some of the examples of how we have worked with the Water Research Centre and the water companies. They are active in terms of joint funding, collaborating or being represented in quite a number of research projects that we fund. We have various ways in which we can establish and maintain contacts with the industry. For example, a colleague of mine some 18 months ago spent a period on secondment with Thames Water, so we were able to learn about each other’s processes and constraints that we each operate under. I think you heard reference to the WaND project earlier that has involvement from several water companies. There was reference to the Environmental Research Funders Forum, which is known as ERFF which has a wide representation of funding agencies and interested parties in the environmental research area. That is a forum by which we can exchange information and discuss changing strategies and priorities for research in this area.

Q599 Baroness Sharp of Guildford: The evidence that we received earlier this afternoon indicated that there is a bit of a problem in terms of funding some of the longer-term research, certainly in things like WRc and, for that matter, the BRE. The implication was that most of that money went to academic groups. Would you agree with them on that, and do you think that perhaps there could be more collaboration between different groups?
Mr Burnell: You mean between different academic groups?

Q600 Baroness Sharp of Guildford: Particularly, that academics should work side by side with organisations like this on some of the longer-term projects.
Mr Burnell: Yes. There is a slight danger here I think we need to try and avoid about equating long-range research, blue skies research, with, if you like, problem-solving research. Problems may be short-term and pressing, but the answers may take quite a long time to tease out. Therefore, I think one of the things that we need to do is to create a research environment where solutions to those problems can be explored and can take as long as it takes, which is why to a large extent the EPSRC some years ago we organised its engineering programme. The structure of the Infrastructure and Environment Programme is funding through consortia, larger groups, multi-disciplinary groups, which are funded for longer than the usual three years, four years or sometimes longer, where the research they are conducting may evolve and change during the lifetime of the funding. One of the things that we encourage is for those consortia to maintain contact with water companies and others. As the problems and challenges evolve, so the research going on in those consortia can change accordingly. I did not get around to answering the question about the possible pressure between short-term needs and long-term research. As I said, I think one of the reasons why the EPSRC reorganised its engineering programme in the way it did is that we are aware in areas such as this that one of the major drivers for funding research is in order to provide solutions to problems to make the environment we live in better. The agenda for that research needs to be set and developed in very close contact with the users of the research, the water industry and others. But that is not a barrier to doing quality research and it need not be a barrier to doing research which may be long-term with long-reaching consequences. One of the ways that we do help to make sure that that happens, I think, is we do fund our research through universities and academic groups. In fact, we are not allowed under our charter to fund for profit organisations directly. Even when we can fund some research organisations directly in these programmes, it is still often better to do it through universities and academic research groups who will publish and put their results into the literature and the results will therefore be available to a wide range of potential users.
Q601 Lord Taverne: My Lord Chairman, I am not quite clear about the overall picture. What sort of proportion of the water-related research do you control? How much of it is controlled by the water industry or organised industry, and is there any other source for water-related research or is this university work entirely controlled or inspired by one of these two sources?
Mr Burnell: As a proportion of the total we control, I have no idea. In terms of what proportion of the academic research in the same way, we are a major player but then so are the other research councils, NERC, ESRC in terms of the built environment implications. There will be research funded in academia directly by the industry, by the private sector, under a contract basis. It is very difficult for us to get an accurate handle on that, because it is very often commercially confidential. In terms of what you might call the generic research base, I would say that while we are a major player, I do not have a feeling for what proportion of the total EPSRC actually funds. Our total investment at the moment in the area of water research we are talking about this afternoon is around £11 million.

Q602 Lord Lewis of Newnham: How many groups would that cover? How many university departments are working in this particular area?
Mr Burnell: Off the top of my head, I do not know. I probably have got the numbers in here somewhere. It is not an enormous number. I think we are probably talking about 12 to 15.

Q603 Chairman: It might be helpful if you could send us a note afterwards just giving a breakdown of that element of funds.
Mr Burnell: Certainly, yes.

Q604 Lord Howie of Troon: An engineering research organisation is usually aimed at doing things and getting things done, getting things built for example. The Environment Agency does not always have exactly the same perspective, and I could not quite speak for Natural England which is very new. Does this create in your field what used to be called “creative tension”?
Mr Burnell: In terms of satisfying requirements for research?

Q605 Lord Howie of Troon: Getting together and producing some useful results.
Mr Burnell: I think “knowledge transfer”, as it is now being referred to, the actual transmission and take-up of results from research in all areas, is a problem we have been facing up to. It is certainly now being tackled in a major way in terms of investment by government and the creation of knowledge transfer networks for example by the DTI, one of which is indeed in the modern-built environment. We have been concerned for some time—for example the SUE consortia, the Sustainable Urban Environment research programme—that the flow of results from that research programme has not been as effective or as widespread as it might have been. One of the things that we have been looking at, in fact we are in the process of organising, is a workshop where Defra officials will spend the day interacting with the 12 consortia that are funding the Sustainable Urban Environment programme to get a better understanding of the research those consortia are conducting, to convey to the consortia themselves what are some of the new, pressing and emerging issues that Defra is facing up to and to try and get a feel for how well one maps on to the other. I said earlier we are more than happy for government departments, such as Defra, to have the style and influence on research where perhaps we have got gaps, and where the existing consortia might be able to tackle those gaps, then to discuss with the department about changing direction in the sorts of things they are doing in order that the research those groups are doing can have a more effective impact on policy-making and practice which government departments are responsible for. We are doing similar things with ODPM and with the Department for Transport.

Q606 Chairman: It does seem to us that the ODPM is the key department because some of the issues that we are all too well aware of will arise from the decision of the ODPM in terms of the Barker Report.
Mr Burnell: Yes, certainly there seems to be a consensus between research councils and government departments that the link between research and outputs for research and policy in forming policy and the needs of policy, for example in informing the research agenda, is not as good as it could be. That is why we are putting a lot of effort into improving those links. We have regular meetings with those departments and concordats; and a couple of weeks ago we met with Michael Depledge, Chief Scientist for the Environment Agency. I have just mentioned the example of the workshop we are organising with Defra, so we are making a serious effort to try and improve those things.

Q607 Chairman: I might suggest you might have a workshop with the ODPM as well.
Mr Burnell: I think that is next on the list.

Q608 Lord Howie of Troon: A workshop is probably a good idea. What I am wondering is, since you are looking for engineering solutions to problems that might be solved in an engineering way, is the Environment Agency a help or a hindrance?
Mr Burnell: A help, that is obvious, yes.

Q609 Lord Howie of Troon: You are clearly an optimist, are you not?
Mr Burnell: I think one has to be. Certainly from the EPSRC’s point of view as an agency but also I think from the academic research community, there does need to be an articulation of what research needs to be done in terms of what the problems are in terms of policy and practice in new legislation, for example, that might be coming through. I think if we were to assume that the academic research groups will acquire an understanding by some magical process, I do not think it will happen.
Chairman: I think we must move on.

Q610 Lord Lewis of Newnham: I take it you are the lead group as far as water is concerned within the university sector, but of course there are other research councils which also must have interests in this area. How do you interact with them? It seems to me that your primary bias now is towards engineering departments. Both as a chemist and biologist, I can see that there are many instances in which environmental work, particularly concerned with water, will be of considerable interest. Are they more or less excluded or looked after by some other research council?
Mr Burnell: In the case of chemistry, a lot of research relevant to chemistry research in water management will be going on within the chemistry programme. It may not have been proposed and funded because of its relevance to water management, but it will be relevant. The team of programme managers in EPSRC maintain close contact; we all inhabit a single office with quite close contact with one another, so we are aware of what is going on in one another’s programmes. I mentioned that the Infrastructure Environment Programme is composed of multi-disciplinary consortia, so where a chemist or a physicist or whoever is needed in order to bring the skills into a consortium to tackle a particular problem, that group, that individual will be part of a consortium and it will be funded by our programme. The fact it is chemistry research is not the point. The point is that my responsibility is to provide a mechanism by which these consortia can come together to provide the right level of skills and disciplines and then to provide the funding. A typical consortium will comprise of different research groups, possibly from several different universities. Certainly they will not all be engineering groups, not by any means. There will be social science groups in there from business schools which traditionally looked to ESRC for their funding, but as a component part of the consortium they will be funded by the EPSRC. Certainly that applies to other disciplines which are under the EPSRC wing, such as chemistry.

Q611 Lord Lewis of Newnham: Can I ask you a specific question. One of the big problems with the Bathing Water Directive is the sampling and the process of sampling. It has been suggested if you take the sampling from the first two centimetres, you will get a totally different measure than if you take it from— I think the present system is about 12 inches below the surface. At one stage—I know this appears in the Chartered Institute on Water Management journals—on a number of occasions they will try and pose the problem, but as far as I know, nobody is looking at this within universities. How would you go about setting up a programme of looking at that particular problem which after all is basic, not unique to this country and is a fundamental question that must apply to all of that type of Directive?
Mr Burnell: In that particular case, if I understand what you are saying, the problem is being described as one of accurate and effective sampling of bath water, then that would be essentially the wording of the call, if you like, that we would issue within the infrastructure and environment programme. We would not necessarily attempt to define which disciplines, which skills, which areas, which academics, for example, what kinds of academics may be needed in order to tackle that problem, we would simply make it clear that we would expect proposals in that area to compose of the right kinds of skills. One of those would be potentially an analytical science group which perhaps has the skills and perhaps the techniques developed in a completely different arena, perhaps forensic science for crime detection and so on. It is one of the challenges that we face but we are getting better at bringing these solutions which may exist in another area to bear on the problem.

Q612 Lord Taverne: You said earlier you were only able to fund academic institutions and possibly private ones providing they were non-profit making, such as, presumably, HR Wallingford. Is it a disadvantage that you cannot fund key private sector consultants like the Water Research Centre?
Mr Burnell: I do not think so. We, in fact, do fund them but the money is—I was going to say laundered—provided through the academic research group that we fund. Part of the research proposal, for example, that they would submit to us will include a bid for funds to have part of that project conducted by that agency as a consultancy, and in fact, it would be the university then that would award the funding for consultancy, not us directly. I think that is a good way of doing it because of the reason I said earlier about maintaining the generic nature of this research. If we were to fund it directly through the consultancy,
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first of all, it would probably have to be a contract which would attract VAT and therefore it would be more expensive to do, but there would be problems in terms of its wider dissemination and its wider availability. Doing it this way through the university group as part of the wider programme of work, we do broaden the base of those who can benefit from the results of that research. I think it is, from our point of view, as the research council, a preferable way of doing it.

Chairman: Thank you Mr Burnell. We have come to the end of the questions we wanted to ask and none of my colleagues have any further points. Thank you very much indeed for what has been a rather long afternoon for you. I am most grateful to you for helping us.
TUESDAY 14 FEBRUARY 2006

Present
Howie of Troon, L
Oxburgh, L
Patel, L
Perry of Southwark, B
Platt of Writtle, B
Selborne, E (Chairman)
Sharp of Guildford, B
Taverne L
Whitty L

Examination of Witness
Witness: Mr Peter Gammeltoft, Head of Unit, Protection of Water and Marine Environment, DG Environment, European Commission, examined.

Q613 Chairman: Good afternoon, Mr Gammeltoft, we are grateful to you for joining us here. Would you like to say anything by way of introduction before we start on some of the questions we would like to ask you?

Mr Gammeltoft: Yes, just a few words; first, thank you very much, my Lord Chairman, for inviting the European Commission here to present its views on these matters. We think these are important matters. I am very happy to have this opportunity for dialogue with a national parliament. Water has a long history in the EU. The first water directives were on the quality of certain waters; there was a sort of patchwork legislation dating from the 1970s. That was supplemented by the Drinking Water Directive and a few other directives came along in the course of the 1980s. In the early Nineties, there was a new phase with two source-oriented directives: one on Urban Waste Water Treatment, which is very important; and the other on Nitrates from agricultural sources. Finally, there were a lot of review provisions in this legislation. It was increasingly clear that both the Council of Ministers—that is the Member States—and the European Parliament—as well as the Economic and Social Committees and other bodies wanted a consolidation of these directives. This is what led to the Water Framework Directive. That gives you a slight historical overview of why we have a Water Framework Directive. We had a number of directives, and these were, to the extent possible, consolidated into one single directive.

Q614 Chairman: Thank you very much. I think we are all now becoming very familiar with the requirements of the Water Framework Directive in setting the agenda. I think I can report that so far we have had some positive responses to the concept. The devil is in the detail of course. There is particular concern perhaps about the implementation of some of the daughter directives. Leading on from that historical analysis, could you tell us if there are any forthcoming initiatives from the European Union which may lead to major changes in the way in which water is managed, or changes to investment needs?

Mr Gammeltoft: The quick answer to that question is that there are no major changes foreseen at this point in time. The priority for the Commission in the years to come will be the implementation of the Water Framework Directive. Having said that, there are a number of directives which require regular review for different reasons—the Drinking Water Directive to make sure that the drinking water standards are up to date with the latest knowledge on toxicology, for example. So there is a review coming up of that directive I think in 2008, and similarly for other directives. The Water Framework Directive is up for review in 2019 on the basis of experience. With the directive, it is normal now—it was not normal perhaps 10 years ago—in the EU that when you adopt legislation you also put in place a system to evaluate how it works, whether it works as it was thought in the ex ante assessments, which is very important; and the other on Nitrates from agricultural sources. Finally, there were a lot of review provisions in this legislation. It was increasingly clear that both the Council of Ministers—that is the Member States—and the European Parliament—as well as the Economic and Social Committees and other bodies wanted a consolidation of these directives. This is what led to the Water Framework Directive. That gives you a slight historical overview of why we have a Water Framework Directive. We had a number of directives, and these were, to the extent possible, consolidated into one single directive.

Q615 Chairman: Some of the directives that we have been looking at carefully and the implications for water management include, of course, the Habitats Directive and the requirements under the Water Framework Directive. Could you give us some indication as to how new proposals emanating from the Commission determine whether or not they are cost-effective, and what assessments are made of the likelihood of the proposals being implemented throughout all Member States?

Mr Gammeltoft: Again, I would say let us compare the past and the present. The Commission has put in place a system of systematic impact assessments of all important proposals coming out from the Commission. That means that there will always be for any major proposal an ex ante assessment of the scientific and technological basis of the directive, of the economics, the impact on different economic sectors, how it is going to impact on the overall economy, and distribution effects and impacts on
the environment. Today, this is a standard procedure in the Commission. That is the first test. The second test is the test of subsidiarity to which all proposals are also submitted to see whether action at Community level is really the best action or whether issues are best taken forward by the Member States. These are the two main tests to which any major proposal today is subjected. I say this in the knowledge that this was not always the case 10, 15 or 20 years ago, but it certainly is the case today.

Q616 Chairman: Could you add how you see the role in the future of the European Environment Agency in determining compliance across Member States? Mr Gammeltoft: It is for the Commission rather than for the European Environment Agency to enforce compliance. The agency is there to provide technical assistance and data to the Member States and to the Community.

Q617 Chairman: That is in order to inform the Commission? Mr Gammeltoft: Indeed, and the Member States and the public.

Q618 Lord Howie of Troon: I have noticed that under the EC Treaty water quality proposals have come under qualified majority voting, but the management of water resources is subject to unanimity. Is this distinction helpful? Mr Gammeltoft: This was clarified in the Nice Treaty, but there was some discussion at some stage about what water management actually meant. The European Court of Justice has actually decided on that. They compared different linguistic versions of the Treaty and it turned out that there might be scope for different interpretations. Some said “hydrological management”, but that has been clarified now in the so-called Nice Treaty as the quantitative management of water resources. So it is now clear what water management means. It does not mean management of water quality; it means management of quantity. In the Water Framework Directive, the main objective is to address water quality and to make sure that sufficient quantities of water of a sufficient quality are available for various uses, such as irrigation, drinking water, et cetera. The thrust of this is quality and, according to a constant practice of the European Court of Justice, where there is conflict, it is the thrust of any directive which decides which is the correct legal basis. This means that in the legislation we have it is always Article 175 of the Treaty, which is the environment article, and paragraph one rather than paragraph two, which requires unanimity.

Q619 Lord Howie of Troon: I would have thought that management of the quality and the management of quantity were in fairly close relation to each other. Mr Gammeltoft: They are in close relation but I think the system today is that the Member States are essentially in charge of managing quantities of water and the Community framework is concerned with quality.

Q620 Baroness Platt of Writtle: To what extent have the EU directives in this sector focused on improving water quality at the expense of increased energy use and emissions to other sectors such as land and air? Mr Gammeltoft: In practice it is clear that when you do wastewater treatment and so on you need a certain amount of energy to run your plant, to collect your water, or you may need to collect the water in any case and discharge it somewhere. There is in practice a certain energy consumption associated with this. Having said that, I think one has to realise that we prescribe only our results; we do not prescribe the method. The obligation is to meet the result of milligrams of something per litre, for example. We do not prescribe how you need to arrive at that.

Q621 Baroness Platt of Writtle: Do you take into account the fact that it could be using a lot of energy? Mr Gammeltoft: We do an economic assessment. Obviously we look at the various methods that you can use to obtain a certain result. You can do it by treatment; sometimes you can do it by upstream changes. If we are talking about a factory, for example, internal changes in an appliance could increase the utilisation of the raw material; often it is the raw material you throw out with the wastewater and the waste streams. Some options, known under the heading of cleaner technology, may reduce the gross emissions before treatment, so you would have less to treat and less energy consumption, for example, in treating. I would say that there is not one single answer to what the energy consumption is. To a large extent, that is in the hands of the Member States, but, given a certain level of technology, one can, of course, establish that there is a minimum amount of energy required. We do not interfere with how the result is achieved; this is decided locally. With energy consumption, there are not just economic considerations. There are also other considerations in different Member States that have an impact on the decision of which way to go.

Q622 Baroness Platt of Writtle: Will the Water Framework Directive allow for a better balance between water quality and energy use in future? Mr Gammeltoft: We think so. As far as energy use is concerned, yes, the Water Framework Directive will put in place a holistic system for water quality management. If you combine this with, shall we say,
Mr Peter Gammeltoft

Within each of these regions, there is a certain homogeneity of lakes and rivers, etcetera. For each of the regions you have essentially a concrete definition of what “good” ecological water quality means. Everything is then put on to a scale between zero and one. To make sure that you can compare between different regions, it has been arranged to have comparisons in the border regions between different regions to make sure that when you score a lake, for example, which is situated on the border between two regions, you apply both systems to that and make sure it scores the same. In that way, you have an index for ecological quality which is comparable across the Community and you overcome the difficulties that are involved. I have to say, that has required quite a lot of work and quite a lot of guidance has been issued. I would like to mention here that we have a number of reports. We have 14 different documents that all look like this. This system works best if there is extensive cooperation between the Commission, the Member States and the European Environment Agency to make sure that we have proper implementation. I have all the guidance documents here on CD-ROM for the committee, if the committee is interested. I would like to leave them with the clerk.

Q623 Baroness Sharp of Guildford: You have talked already about the Water Framework Directive bringing together the earlier directives. Do you see this as the main rationale behind it? Could you also expand on exactly what is meant by “good” ecological status? To what extent does this definition vary between Member States, either because of different ecological contexts in the Member States or because of different interpretations of the concept at the national level?

Mr Gammeltoft: Let us start with the Water Framework Directive. It does bring things together but the idea is also that when you bring things together and rationalise things, you end up getting more rational decisions. The concept of river basin management will help. In the past, there was no systematic application of this kind of principle, which meant that you could very often have decisions taken at cross-purposes within one and the same river basin, so that investments in one place were really lost because of lack of action in other places, or because of different actions going in different directions. This should bring a more coherent and more economic approach to the management of water quality. I think this is one of the great things that this directive does, apart from simply putting a number of directives on top of each other. As for the concept of ecological water quality, maybe a historical view of this would be helpful. The Commission first put forward a proposal with an empty annex, essentially saying that there are a number of elements that need to be considered and that the detail of this should all be adopted by committee procedure. Neither the Council of Ministers nor the European Parliament wanted to hear about this. They insisted on the Commission very quickly developing an additional proposal to fill this in. We started a group with experts from all the Member States that was led by one of the Member States to develop this. We had an independent scientific committee on toxicology, ecotoxicology and the environment, and the concept of ecological water quality was peer reviewed in this committee. So there is a concept, and it is a peer-reviewed concept. On the other hand, it is also clear that a river in southern Italy is not the same as a river in northern Finland, for example. The way it has been devised is that Europe has been divided into a number of so-called intercalibration regions.

Q624 Baroness Sharp of Guildford: How realistic do you think it is that the EU will achieve “good” ecological status by 2015?

Mr Gammeltoft: I think the Council and Parliament set that as an objective back in 2000 when this directive was adopted through a conciliation procedure, as important directives very often are. Of course, we as guardians of the Treaty are very keen that all the Member States implement this and that these are implemented properly, but we are also aware, of course, that there are a number of difficulties that need to be overcome. Agriculture is one of the issues which is notoriously difficult to manage in this context. Another one is the whole issue of the impact of climate change. Climate change may not have the full impact between now and 2015, but I think in the longer term we also need to think about how we are going to deal with the issues of climate change when more floods, more violent weather events and so on will mean a strain on water resources and it will mean mobilisation of all sorts of sediments when pollutants we thought were very well buried will be brought back into the water cycle. We have a report, which I have brought along, which I can also leave for you, edited by the Joint Research Centre of the European Commission.

Q625 Chairman: I hope you will not come back and test us on all these things?
Mr Gammeltoft: No, I will not. Do not worry.

Q626 Baroness Perry of Southwark: I want to ask you about the daughter directive on priority substances. Do you think that the proposed reduction or eradication of priority substances is realistic? In particular, do you think we have methods of analysis which are capable of detecting priority substances to the required limits of detection? If not, are these capabilities likely to be a limitation on the identification of such substances?

Mr Gammeltoft: First, a little semantic issue: I do not think that the framework directive talked about eradication. It does talk about cessation of discharges and losses.

Q627 Baroness Perry of Southwark: I was asking about the daughter directive on priority substances.

Mr Gammeltoft: Yes, but this is a requirement which has its origin in discussions on the marine environment. It started at a North Sea conference in 1995. It was then taken up by the OSPAR Convention about the North-East Atlantic. From there, it came into the Water Framework Directive. I have to tell you here that it was not the Commission that proposed to put this into the directive; it was the European Parliament that wanted it there in the conciliation phase where the Commission is essentially a sort of mediator between the Council and the Parliament and is there to facilitate a solution. We are no longer in charge at that stage of proceedings. Having said that, our view was not that we thought this was a bad objective, but we considered this to be a political objective and that it should not be transformed directly into law. Now it is in the law and obviously we will have to find a way of managing it. There are two things that we need to consider in the context of the daughter proposal. One is that for these substances we need to set ecological quality standards for different kinds of waters; that is a fairly straightforward exercise. That can be done on the basis of risk assessments. This has all been prepared on the basis of a risk assessment which has been taken forward in the context of the Community system for risk assessment of chemicals that is the predecessor of REACH. There was an assessment which led from an original list of 132 priority substances to one of 33 substances. We are now in the phase of preparing a proposal, so it is very difficult for me to speak at this stage about what exactly the content will be, but we will address both the issue of quality standards and the more difficult issue about what to do about the cessation and how the discharges from these substances are going to be managed, the losses and other inputs into the environment. The final thing I want to say is about the marine environment, because it is the sink where a lot of these substances end up.

Q628 Baroness Perry of Southwark: Do you think we are capable of detecting these substances at the very low levels?

Mr Gammeltoft: I think we are capable of detecting such substances at increasingly low levels. Progress in analytical chemistry does lead to lower and lower detection limits for these kinds of substance, which makes it extremely difficult to operate at zero.

Q629 Lord Taverne: Is not the difficulty that in fact we are far too capable of identifying it, that we can now identify infinitesimal quantities, which have no relation to health or the environment at all? I think that the framework directive talked about eradication. It does talk about cessation of discharges and losses.

Mr Gammeltoft: I would like to come back to what I said earlier about doing impact assessments. For an issue like this, impact assessment is obviously part of the exercise in producing a proposal, and the results of such an impact assessment will have to be taken into account in such a proposal.

Q630 Baroness Perry of Southwark: How do you feel that the control of these substances can be managed in terms of diffuse pollution? Do you think that perhaps the solution is going to be in water treatment rather than an attempt to prevent them entering the water courses in the first place?

Mr Gammeltoft: No, I do not think so. We have a system for pesticides, for example, both for plant protection products and the so-called biosides, that undergo an assessment. One of the things that is assessed in the context of improving their marketing is their potential to pollute, for example, groundwater. The requirement is that pesticides should not pollute groundwater to more than drinking water standards. Provided that the Member States operate the system properly, there should be no problem about that. There is a number of instruments available. There are products and substances where this kind of regulation is possible. There are others where it may not be feasible for one reason or another, and you can move towards banning certain substances where necessary. All this needs to be very carefully assessed as to which is the right option. Obviously the ban goes much further in limiting the freedom of business and others to use the substances, and therefore it needs a proper justification, but there are different options. There are also options that we are concerned with in the
context of agriculture—the use of fertiliser. Used in small quantities, fertiliser may not pose a problem. It is not the fertiliser per se that poses the problem but the quantities in which it reaches the water environment. It is possible, for example, to provide incentives for farmers to use it properly, either by direct payments to them in the framework of the Common Agriculture Policy or through cross-compliance requirements where you say that other kinds of payments are dependent on compliance with certain environmental practices. I think there is a whole series of different kinds of measures that one can take to reduce pollution. That requires a major analytical effort, firstly, to find out where the problems come from and, secondly, to find out what the solutions are.

Q631 Chairman: You referred to the need for a regulatory impact assessment. That clearly is very important and it will reveal the costs. I have to share with you that some of the water companies we have talked to have been extremely concerned about the potential impact. Of course, until this directive is published, no one knows what we are talking about, and until this regulatory impact assessment. This brings us back to an earlier question about how rigorously you impose, as a result of the impact assessment, a cost-benefit analysis. Could you give us some assurance that the water companies in Europe are not likely to face what some of them believe to be potentially prohibitive costs?

Mr Gammeltoft: We are obviously going to do a cost-benefit analysis but I think one has to face the fact that we are limited by the data available. The data available are not always perfect; data about pesticides, for example in the environment, assessing what sort of effort may be necessary. I am quoting this as an example. I do not think this is perhaps a big issue today. It is an example of the kind of considerations you have to go through. Firstly, you will need to assess the current state of the environment; that is the current content of pesticides in the water resources. You will then need to look at the drinking water standards and see what you need to do to turn your raw water into your drinking water, and assess what that is going to cost. The first set of data you need is data about the content of pesticides in raw water. Then you need cost data, and so on. That is one part of it. The data are not always perfect, I have to admit. More systematic data collection for this kind of purpose has only started in recent years. The other side that you need to know is the environmental benefit. For drinking water, that is relatively simple: it is health. There are well developed methods to assess health benefits and put a price on health benefits. When we come to the benefits to nature, ecological benefits, things become more difficult because essentially there are no fully developed evaluation methods for the environment. That cannot always be put forward by simple arithmetic—costs and benefits and then see what the difference is, whether positive or negative. In some cases, we have to go through a more qualitative description of what the benefits are, and then it becomes a question of appreciation by the political decision-makers.

Q632 Chairman: Would you hazard a guess as to when we will see the directive and when it will be published? I know it has been promised for two or three years now. Perhaps we should not complain of that because it gives you time to do these analyses.

Mr Gammeltoft: That is the whole point. There are several reasons for the delays. One is delay in the risk assessments which under our system were in the hands of the Member States. There are also delays in the Commission. These are exactly related to the kinds of issues you were raising, my Lord Chairman, that we did not think that the information available was sufficient to go ahead. I am not promising that you may find all the information once the proposal comes. But it is on the way and we hope to have it out in the next few months.

Q633 Lord Patel: To a degree you have answered the question I was going to ask. It was about the proposals related to priority substances and priority hazardous substances. Given that it will push up energy use and therefore greenhouse gas emissions and capital expenditure, what is the scientific evidence that states we need to do this, particularly the evidence of its impact on health?

Mr Gammeltoft: When we are talking about drinking water, the parameters we have for are all very well investigated and the health impact is well known. This is an area where today we are able to quantify the risk.

Q634 Lord Patel: Is that so for priority substances also?

Mr Gammeltoft: For priority substances it is much more an ecological risk. As I said before, it was mainly driven—and particularly for the so-called priority hazardous substances where the requirements are larger and the costs may also be larger for that reason—by issues in the marine environment.

Q635 Lord Patel: So it is not related at all to the health impact?

Mr Gammeltoft: It can be. If drinking water is abstracted from fresh water, there can be a health impact. There is also, independent of this obligation, an obligation in the Water Framework Directive to safeguard the water industry so that you do not pour in upstream of the abstraction points all sorts of
pollutants which could be removed at a reasonable cost at source and where the water industry then subsequently has at high cost to remove them again from the raw water they take in from a water course, for example, or from a groundwater borehole.

Q636 Lord Patel: Are you addressing the growing complexity of pharmaceutical and personal care products and the impact of their disposal upon water quality?

Mr Gammeltoft: Yes. You may have heard of what are known as endocrine disrupters that belong in this family. For a number of years, this has been an issue of concern. There is money in the Community Research Programme being spent on this. It is a difficult issue because as yet we know so little about it. We are in discussions with the European Medicines Agency about this. We also deal with the cosmetics legislation, which today I think is primarily focused on protection of the user of the cosmetics. We are making an effort to make them aware that there are other issues with which they should be concerned about these things. There will be more research in the future. I do not think today we are quite ready to regulate these but we are very much aware of the potential health problem that can be associated with these substances. We are doing our best to make our colleagues in charge of research dedicate money into research on the health effects of these kinds of substances.

Q637 Chairman: The Habitats Directive requires the precautionary principle to be deployed. There is an onus therefore on agencies within Member States to prove that abstraction is not going to damage the Natura 2000 sites. Is this always appropriate or do you think that perhaps this might impose too strong an obstacle to the optimal use of water?

Mr Gammeltoft: I think we have here an interface between two pieces of legislation which work in a very different way and have very different objectives. The objective of the Water Framework Directive is to maintain water quality at a good level so that water is available as usual. The Habitats Directive is there to protect biodiversity. It does not, like the Water Framework Directive, have the general ambition to protect all waters. It is not the purpose of the Habitats Directive to protect all habitats. Instead, the concept of the Habitats Directive is to create a network of protected sites, which will ensure that different species and habitats have a conservation status that will allow them to survive, so that we can still have this degree of biodiversity. We have two pieces of legislation here which cast a slightly different angle on this. This needs to be borne in mind when considering the issue of what happens when you have one set of requirements in the Water Framework Directive and another set of requirements in the Habitats Directive. If you have a water abstraction issue in a Natura 2000 area, the first point is that if you can show that there is no problem, the problem has gone away. If there is a problem, then the question arises as to what you do about it. There may be several issues here. The Habitats Directive has a whole series of requirements. I think Article 6 of the Habitats Directive specifies what you need to do. First, you need to do an investigation into what the options are, and there may be options available to satisfy the requirements. In that case, you can go ahead with these options. If there is no option, the issue of compensatory measures arises; that is a possibility under the Habitats Directive. It depends on the interest in the matter. If there is an overriding interest, there is one situation. If there is not an overriding interest, there is another situation. It also depends, in all fairness, on whether you are able to move the abstraction point somewhere else; that is also an option. You can take measures in the area concerned to mitigate the effect of abstraction; or you could have compensatory measures somewhere else to provide the same biodiversity, to put it that way. There are different procedures for all these things. It is not just a blind alley for the water industry but some of the options require the water industry to act. One of the options is to move the abstraction point somewhere else if that is a possibility.

Q638 Chairman: Would you be concerned if generic rather than site-specific solutions were implemented? In other words, rather than do research on the site, if a generic formula was applied, would that give you the assurance you were looking for?

Mr Gammeltoft: From the Water Framework Directive point of view, there is a lot of generic work going on because it is a system that is being applied across a series of waters. In the Habitats Directive, generic assessments may not be appropriate because the particularities of a site are the determining factors. We are promoting more research on this. Some of the questions you want to ask concern research programmes. I would point to the fact that water research is also part of the proposals for the Seventh Framework Programme. There is an opportunity as it is currently under negotiation. If you want to strengthen this, now is the time to do it. It is up for negotiation with the Council of Ministers and the European Parliament.

Q639 Chairman: You would favour more underpinning research in this area?

Mr Gammeltoft: Definitely, and there is clearly a need for that.
Q640 **Chairman:** Are we in danger of trying to implement the Habitats Directive before we have done the underpinning science?

*Mr Gammeltoft:* Some would say that if we do not implement it then we are in danger of letting the species and the habitats slip while we do the research.

Q641 **Lord Oxburgh:** Staying on the question of research, how sufficient do you think EU funding is for research into water issues and how is this distributed amongst the Member States? Sometimes we hear complaints about the bureaucracy, do we not?

*Mr Gammeltoft:* Let me comment on that. Firstly, yes, substantial funds have been invested over the years under both the Fifth and the Sixth Framework Programmes in environmental research, including water-related research. I think the issue may be to ensure the good use of the money. As for the distribution amongst Member States, offhand I do not have any data on that, and the criterion for distribution of research money is not a national criterion; it is the quality of the research proposals received that decides where the money goes. We think that is the right way to do it. On the issue of procedures, it is clear that always in this kind of situation you have to strike a compromise between, on the one hand, the risk of abuse of public money and, on the other, ensuring the good use of it and preventing misuse of the money. This kind of prevention of misuse very often brings with it a certain amount of bureaucracy. I think there is a trade-off between the amount of bureaucracy and the degree of security needed so that the money is properly used.

Q642 **Lord Oxburgh:** Again, it is a question of distribution. Some of the bodies in this country feel that the fact that they do not receive more funding from Government here militates against their applications for matched funding from Brussels. The question is: do you feel that domestic home funding is indeed a criterion in the allocation of EU funds?

*Mr Gammeltoft:* I can come back to you on that one other industries, NGOs and consumers. All sorts of information systems where you can layer information about land use and monitoring stations and monitor results on drinking water supply and agricultural intensity and so on in an area to gather all the relevant information. It will take until 2010 but there should be an on-line prototype about a year from now.

Q643 **Lord Oxburgh:** It is certainly a belief held by some people. It may be that their applications are no good but that is what they believe.

*Mr Gammeltoft:* Yes, I understand. I am happy to send you a note on that.

Q644 **Baroness Perry of Southwark:** I wonder how satisfactory the arrangements for the sharing of water-related data between the Member States are? Do you find that the data that is collected by Eurostat is useful in this?

*Mr Gammeltoft:* If you look at this CD-ROM, you will find that we are in the process of building up a system known as WISE—Water Information System for Europe. This is a joint action with the European Commission, including its Joint Research Centre, the European Environment Agency and Eurostat to try to pull together all the data to make it available more quickly. I do not know to what extent you read reports from the European Environment Agency but reports coming out in 2005 typically report data from 2001 and maybe 2002. We are trying to speed this up to make monitoring of data and all other kinds of data relating to water available at an earlier stage and electronically. With today's technology, you can log onto a website and link into other websites. We will combine this with the so-called geographical information systems where you can layer information about land use and monitoring stations and monitor results on drinking water supply and agricultural intensity and so on in an area to gather all the relevant information. It will take until 2010 but there should be an on-line prototype about a year from now.

Q645 **Baroness Perry of Southwark:** Is there a forum within the EU where the national agencies responsible for water management come together face-to-face and discuss matters?

*Mr Gammeltoft:* We have a forum, under what is known as a Common Implementation Strategy, which was decided by the Environment Ministers and by Commissioner Walstrom some years ago. We have a whole structure which brings together Water Directors from the environment ministries of all the Member States, plus representatives from the accession Member States like Bulgaria, Romania and Croatia, the EEA (European Economic Area) states, Norway and Iceland, and often the Swiss as special guests. At this kind of meeting we discuss water issues and in particular the implementation of the Water Framework Directive. Under that we have another group, a so-called Strategic Coordination Group where we invite stakeholders, the water industry and other industries, NGOs and consumers. All sorts of groups are invited to contribute to this. All these documents that I have brought are being developed and discussed in this forum before publication so that we ensure that the Water Directors have endorsed the documents before we publish them.

Q646 **Chairman:** You referred earlier to the particular problems that agriculture and indeed climate change impose on determining future water management policies in Europe. Would you like to speculate as to how agriculture will be able to contribute to the Water Framework Directive based on management schemes? What do you think the impact will be in the long run on agriculture? To what
extent would it be feasible to reduce the diffuse pollution which is attributed to agriculture?

Mr Gammeltoft: We believe that it is feasible. We are doing a lot of work. We are not in a situation where we can control all impacts at this particular stage. We are making a vigorous effort to get the Nitrates Directive properly implemented. That is still causing problems and more effort is needed in this area. Once that is fully implemented, it will reduce substantially the diffuse losses of nitrogen in agriculture. Once the pesticides legislation is properly implemented, and there are problems in this area also, that will also help. On top of that, there are other issues, for example phosphates, with agriculture. There are no controls on that at this stage. We plan to discuss with our Commission colleagues in Agriculture the CAP reform in 2008 and what can be done because more could be done in the context of rural development money. A substantial and increasing part of the agricultural budget is going into the part which is not price support but so-called Rural Development funds. Our thoughts are that we should try to channel more of this money into promoting environmental measures in agriculture on the rural development side. It is too early to say what proposals the Commission will bring forward but these will only be adopted in 2008. We are working to improve the measures in agriculture in this respect. This will then help to support local measures. The whole idea is that you can decide locally in a river basin management plan that agriculture in this particular river basin has to carry out measures X, Y and Z. The idea would then be that farmers implementing these measures could be eligible for support from Rural Development funds.

Q647 Chairman: Would you accept that the reforms of the Common Agricultural Policy, which many would agree were overdue, do, nevertheless, put farmers now in a much more commercial competitive situation with other producers around the world? One of the implications we see in the United Kingdom is that for people trying to achieve economies of scale, that very often means more cattle, more livestock within a unit, which of course is putting more pressure on water courses and other environmental impacts. Do you feel that these inevitable consequences of a fiercer economic climate will be modified by the Water Framework Directive or do you think there is an inevitable increased impact?

Mr Gammeltoft: This is something that one should address in the River Basin Management Plan. If livestock density is too high, this is an issue that can be addressed. We have this in the Nitrates Directive. There are effectively limits on livestock density there. It is a directive which is adopted under Article 175 of the EC Treaty, which means that Member States can go further. It is not like the internal market directives where it is very difficult to adopt a measure which is different.

Q648 Chairman: Clearly there is a debate to be had as to whether you can remain commercial and yet reduce stocking rates. One is pressure one way and the regulation is pressure another?

Mr Gammeltoft: That is clear. The agricultural policy has for many years been based on subsidies to farmers in one way or another. The concept that we are exploring at the moment is that of trying to use some of these subsidies to get farmers to take environmental measures.

Q649 Chairman: There are of course some carrots within the reform. Perhaps they can be more adequately funded, which would certainly redress this issue, but I think that is a bit beyond the brief of what we are talking about today. Lastly, would you like to speculate on the Nitrates Directives that you say has not been universally successful and to what you attribute that failure?

Mr Gammeltoft: There are several layers in this failure. There are many agricultural aspects. There is a huge difference between regulating cars where you have 10 manufacturers and regulating anything to do with agricultural produce where the numbers of producers run up in the millions. There is an issue of communication with farmers about why this is important and in making sure that all farmers understand exactly what needs to be done and why it needs to be done. There is also an issue of creating incentives for the farmers to do it. Finally, I think there is also an issue on how to enforce that. Enforcement vis-à-vis a large group like farmers is a difficult issue. There are pressures from the market. It is correct that farmers are feeling pressures from the market; it is not just about liberalisation. There has always been a fear in the farming community that they might be the only ones taking these measures and that they would be prejudicing their economic results if they took such measures.

Q650 Chairman: We have probably come to the end of the questions that colleagues wanted to ask. We are most grateful to you for the patience and clarity with which you have answered our questions, ranging over a wide area. You have given us a lot of homework, which we will look at carefully. Thank you very much for your help today.

Mr Gammeltoft: I will leave these reports for you. There is also one on managing Natura 2000 sites and the provisions of the habitats article, Article 6, which is the one we talked about.
Supplementary Evidence from Peter Gammeltoft, Head of Unit, Protection of Water and Marine Environment, DG Environment, European Commission

NOTE

Subject: Water Abstraction in Areas Designated Under the Habitats Directive as Special Areas of Conservation

The rules applicable in case of development places a project to safeguard the conservation interest in such areas are contained in Article 6 of the Habitats Directive.

Water abstraction for water supply purposes carried out in special areas of conservation and likely to have a significant impact on the site are required to undergo an appropriate assessment of its implications for the site, and the competent authorities are required to agree to the abstraction only after having ascertained that it will not adversely affect the integrity of the site.

1. New Water Abstractions

The practical implication of this requirement for new abstractions needs to be seen in the light of the purpose and nature of the Europe-wide Natura 2000 network of special protection areas. The purpose of the Network is to preserve at a national and European level species and their habitats and should be seen as part of the wider efforts to preserve biodiversity. It is therefore the contribution of individual sites to the quality and nature of the overall network of sites which is the critical objective—the concept of favourable conservation status relates to the network as a whole not to individual sites.

If the result of an assessment is that there are no important implications for special conservation area concerned, there would appear to be no legal impediment in the Habitats Directive to its continuation. If, on the contrary, there are important implications it will need to be assessed whether alterations in the water abstraction activity (eg partial or full relocation within the area) would make it compatible with the objectives of establishing the special area of conservation. If such alterations are feasible, their implementation will ensure that there is no impediment to the water abstraction in question.

Even in cases where alterations in the water abstraction activity would still result in adverse effects on the integrity of the site, plans or projects may nevertheless be carried out provided there are imperative reasons of overriding public interest, including such reasons of a social or economic nature.

Where a Member State, in spite of the adverse effects on the integrity of the site, decides nevertheless to go ahead with a water abstraction in a special area of conservation on the basis of imperative reasons of overriding public interest, there is an obligation on the Member State to ensure the overall coherence of the Natura 2000 network. This may include taking measures at other sites, unrelated to the water abstraction in question.

Even in the remaining cases where there are significant adverse effects and no imperative reasons of overriding public interest, simple solutions of moving water abstraction to other locations outside the special area of conservation may often be available to eliminate the problem.

2. Water Abstraction Existing at the Time of Designation of a Special Area of Conservation

For existing water abstractions, there would only be an issue about compatibility with the Habitats Directive if the assessment showed an ongoing deterioration of the factors for which the site in question was designated. Only in such cases would the above considerations for new abstractions be relevant. The normal point of reference would be that the impact should be maintained at the level at which it was at the time of designation of the special area of conservation.

The above regime would apply except in relation to sites which host species or habitats which are threatened at the level of the overall Natura 2000 network. In this situation, restoration beyond the situation at the time of designation may be required in order to restore a “favourable state of conservation” for this species or habitat. Such requirements for restoration might not imply all possible sites, but only the sites necessary to improve the conservation status of the species/habitat concerned at the level of the network.
3. CONCLUSIONS

It would therefore in conclusion appear that for both existing and new water abstraction several possibilities are available for the operators in special areas of conservation, including continuing abstraction in the areas, with or without alteration of the conditions of abstraction depending on the circumstances at the individual site, and moving the abstraction activity wholly or in part to other locations. Only when all other options have been exhausted can it be concluded that it would be necessary to cease the water abstraction activity in question. In particular, no evidence has been provided to the Commission to support any conclusion that requirements under the Habitats Directive to change or relocate water abstraction activities located in Natura 2000 areas would cause substantial and disproportionate costs for the water industry.

March 2006

Supplementary Evidence from Peter Gammeltoft, Head of Unit, Protection of Water and Marine Environment, DG Environment, European Commission

NOTE

Subject: Community Funding of Research and Technical Development Projects

On the question of Community funding of RTD projects, there is no prerequisite for domestic (national) funding to be eligible and obtain Community funding, as laid down in the rules for the participation of undertakings, research centres and universities in, and for the dissemination of research results for, the implementation of the European Community Framework Programmes.

According to the rules of participation for the 6th Framework Programme (COUNCIL REGULATION No 2322/2002/EC), the main conditions for participation are related to the technical competence and resources, including the financial ones, of the participants.

More specifically, participants have to demonstrate that they have the knowledge and technical competence, as well as the potential resources, needed to carry out the indirect action and at the time when they present their proposal. In addition, participants must be able to specify the relevant source of those funds made available by third parties, including public authorities.

March 2006
**Memorandum by the Institution of Civil Engineers**

**INTRODUCTION**

The Institution of Civil Engineers (ICE) is a charity that exists to promote and progress civil engineering. It was established in 1818, and currently has over 77,000 members.

ICE’s strategy is to be the leader in shaping the engineering profession, and our vision is to be recognised as the leading source of knowledge and skills required to create a sustainable natural and built environment for the benefit of future generations. The Institution’s core purpose is to set standards for qualification and registration of all engaged in civil engineering; to provide a knowledge exchange for best practice; and to promote the contribution that we make to society.

ICE would be happy to assist the Committee’s deliberations further, if it was considered helpful.

1. **Defining the Problem**

1.1 *What are the causes of the current problems of water supply, and how serious are they?*

The causes of current problems can be summarised as:

- Rising demands in South East England due to immigration into the region both from within UK and abroad—for example 800,000 people are forecast to move to London over the next 10 years.
- Rising demands due to more use of dishwashers and power showers, and from smaller households leading to higher per capita usage.
- Reduced availability of water which could amount to 2500ML/d by 2030 (15 per cent of all supplies in England and Wales) due to:
  - Cutting back on allowable abstraction from rivers and groundwater to reduce environmental impact and comply with legislation such as the Habitats Directive.
  - Reducing availability of groundwater due to pollution.
  - Reducing availability of water from rivers and groundwater due to climate change.
- No development of major new water resources over the last 20 years, whilst there has been an intensive drive to reduce leakage and control demands for water.
- Difficulty in achieving further significant leakage reduction in unless there is major increase in investment in replacing old water mains which would drive politically unacceptable rises in water prices—at present most companies are close to their economic levels of leakage which are reached when the cost of further leakage reduction exceeds the cost of developing new resources.
- Insufficient publicity for the need to reduce water consumption from both the government and water companies.
- Public apathy in reducing personal water consumption because of lack of awareness and incentives—currently less than 25 per cent of households are metered and charged by volume consumed.

The potential seriousness of the problem is illustrated by the threat of the possible reduction of 2,500ML/d referred to above, compared with only 500ML/d of major new resource development by 2025 in current water company plans. The shortfall of 2,000ML/d amounts to about 12 per cent of current supplies. Is it feasible to cover the shortfall through water saving and leakage control? Are the water companies doing enough to achieve these savings? Are the plans for new resources sufficient and are they being pursued with sufficient vigour?
In well-developed countries such as UK, effective provision of water supply requires that water available for use exceeds demand to the extent that restrictions like hosepipe bans are rarely required. “Rarely” has come to mean less than once a decade in England and Wales; at all other times, including minor droughts, public consumers expect their demand for water to be met in full.

Typical recent breakdown of water use in England and Wales is shown in Figure 1. Essentially:
- 48 per cent of water into supply is for household use (measured and unmeasured).
- 23 per cent is for non-household use (measured and unmeasured).
- 23 per cent is lost to leakage.
- 6 per cent is for other uses such as treatment works operations etc.

Leakage has been a focus of investment for some years and in many areas significant further reductions will be disproportionately costly to achieve, because of the age and condition of the assets involved (buried pipes). Significant further declines in non-household water use are also not anticipated under the current charging regime. Meanwhile household use is increasing, particularly in areas of strong population growth such as South East England, where many more homes are planned. Household use varies seasonally and its “peakiness” has become more pronounced in recent years, particularly in the drier South and East of England where supplies are less plentiful. Ensuring adequate supplies during demand peaks can be particularly challenging for some water companies.

Rainfall—the primary source of water for public supply varies spatially, seasonally and annually. It is least in the more populous South and East; the plentiful months do not coincide with the high demand periods for household water use, and multi-season droughts are not unknown (for example, 1976). Meanwhile various factors are reducing the availability of natural supplies from which water can be drawn. These include:
- Tougher legal safeguards (eg Habitats Directive) for environmentally important sites, coupled with a better understanding of their sensitivity to local water abstraction (commonly significant in the Chalk and Limestone areas of the South and East of England); there could be 700ML/d of loss of resource due to environment-driven cutbacks at existing sources.
High drinking water quality standards, against a background of creeping contamination of some sources (due to rising nitrate levels) that necessitate blending, better treatment or source replacement. The British Geological Society has estimated that 1,000ML/d of supplies could be lost due to pollution by 2030.

In addition climate change is predicted to lead to wetter winters and drier summers, exacerbating the seasonal mismatch between demand and supplies—traditionally overcome by using storage reservoirs. Climate change studies have suggested a reduction in summer river flows in South East England of 30 per cent by 2030 and 50 per cent by 2050. Severn Trent Water has estimated 15 to 20 per cent loss of yield from rivers and reservoirs and 5 per cent loss from groundwater by 2030. In terms of rainfall available for use per capita, South East England is already drier than Madrid or Istanbul and over 50 per cent of all rainfall is currently used for water supply.

Over the past 20 years, UK has been following a “twin track” approach to balancing available water supplies with demands. The twin track approach involves:

— Reducing demands for water by cutting back on leakage and reducing water consumption through measures such as low flush toilets, water efficient domestic appliances and, particularly, metering of domestic water supplies so that householders pay by volume consumed and thereby have a greater incentive to save water.

— Building new water resources, typically through enlarged reservoirs, storing more winter rainfall and river flow and more abstraction of ground water.

Quite rightly, there has been much emphasis on the management of demands to avoid development of new resources. During the past 30 years, there has been little investment in new water resources, for all the right reasons, but the “slack in the system” has been taken out so that significant investment is needed if future development aspirations are to be met.

There is evidence that declining headroom over recent years is becoming unsustainable—that is to say, problems are accruing in relation to safeguarding future water supplies that will require significant investment by future generations to resolve.

1.2 What are the projections for future water supply and what factors will influence these projections? Where, and over what timescales, may problems emerge?

The Environment Agency maintains an overview of the supply/demand balance in England and Wales through regular reviews of water companies’ plans and its own regional analysis. Its 2004 report to Ministers on water companies’ resource plans, *Maintaining Water Supplies*, stated that “all companies, if they follow these plans and their drought plans, will be able to meet their customers’ needs for the next five or more years without unnecessary restrictions or inappropriate drought permits and orders”. The report went on to note that some companies need to carry out urgent work to maintain security of supply but those involved have plans in place for this, whilst other companies need to start work on measures to secure supplies into the 2010s and 2020s. Note that this commentary is based on water company plans; South East England companies’ plans include projections for new housing growth that are 20 per cent lower (up to 2016) than the projections contained in the ODPM’s Sustainable Communities Plan. This discrepancy equates to about 200ML/d demand at current consumption rates. Water companies in the South East also do not allow for any increase in non-household water use associated with the economic growth that will be needed to provide employment for increased population.

In *Maintaining Water Supplies* the Agency expresses concern that many plans are dominated by major resource developments. It needs to be recognised that the identification, planning, promotion and implementation of water resource developments is a complex and drawn out process that can take 15–20 years to complete and is commonly fraught with uncertainty along the way. The most recently commissioned water supply reservoirs, Roadford and Carsington, exemplify this; promotion alone was spread over a period of eight years for Carsington, and the public inquiry for Roadford was reopened several times between 1978 and 1983 to consider various topics before powers to implement the scheme were finally granted.

Whilst welcoming the fact that all companies propose increased levels of household metering, the Agency believes that companies underestimate the role demand management can play in managing water resources for the next 25 years.
28 February 2006

Metering opens the way to volume-related charging, a necessary precursor for effective demand management. However, the evidence that metering per se significantly reduces per capita water use in the medium/long term under the current water charging regime is less than compelling. At present less than 25 per cent of household water use is measured, although water companies plan to increase this to about 40 per cent by 2010 and 60 per cent by 2030. For metered properties the charging regime could be designed to foster meaningful behavioural change in household water use. Rising block tariffs and high season excess use surcharges are among the charging mechanisms that might be introduced; however, these would need to be designed so that companies are not tempted to maximise revenue by increasing volumes supplied in preference to honouring their legal obligations to foster water efficiency.

Without a serious government commitment to implement full metering quickly, it is unlikely that significant reductions in household water use can be achieved by this route within the timeframe by which some companies will need to commit to major new sources to avoid future shortfalls in supply, therefore.

Development pressures are strongest in South East England. Although drought reliable supplies exceed forecast demand into the future in England and Wales overall, it is not the case for several companies in the South and East unless they develop new sources.

Water is a cheap resource that is expensive to move, so new local source development is more cost effective than mobilising the surplus from elsewhere. Future needs in the East of England cannot be met from within the Region and further development is likely to become unsustainable. Demand will exceed drought reliable supplies within five years without the planned new resources.

The Barker Report, which forecasts housing growth required to achieve stability in the housing market, identifies significant additional needs in South and East England. There is no current water supply solution to the high housing growth it suggests. Significantly improved water efficiency is an essential component of any such solution, but there is as yet no credible strategy for achieving the step change reduction in per capita water use that it would require.

There remains scope to reduce household water use by building in efficiency to new homes (about 0.7 per cent pa of total housing stock in 2003) via changes to the Building Regulations, and encouraging behavioural change among residents of existing housing stock (likely to have limited impact without incentives).

Demand management would be easier to implement in the non-household sector due to the high proportion of metering (almost 96 per cent—see figure 1) and the greater scope to introduce competition with its associated potential for innovative charging. Political will would be required to drive this forward; access codes and prices currently being published by water companies to increase competition are heavily loaded against new entrants in terms of costs and risks to be borne.

Finally growth in population in the South East will lead to increased sewage volumes (if per capita water use is not reduced) or concentrations (if it is). There are concerns about the treatment/disposal problems this will cause; new sewage treatment processes will need to be developed, if river water quality standards are to be sustained or enhanced in line with the objectives of the Water Framework Directive.

1.3 Is sufficient research being devoted to predicting, and handling, possible future scenarios?

The Environment Agency and UK Water Industry Research (UKWIR) have invested extensively in developing common methodologies for demand forecasting, source outputs, environmental cutbacks and the like over recent years. However uncertainties remain, particularly in relation to:

— Future housing growth.
— Demand reductions that can be relied upon from metering and other management measures.
— Political commitment to demand management, sustainable housing etc.
— Effects of climate change on source availability/customer behaviour.

Many of the uncertainties in water resources planning are commonly allowed for through “headroom”—a margin of available resources over forecast demand. Headroom calculation has been the subject of much research but needs to be kept under review as supply networks become more integrated.

Ofwat remains concerned at the imbalance in Levels of Service (DG4) and Security of Supply Index between contiguous companies; for example Wessex has a one in 100 year restrictions standard whereas evidence suggests its neighbour Southern Water has a much lower standard, of the order of one in 10 years. Research
is needed to confirm whether or not introducing more uniformity would release water for transfer between companies sufficient to improve the supply/demand balance of one without serious adverse impact on the other.

More work could also be done on the scope for sharing water between companies. Some useful studies have been undertaken for the water companies in the South East, and the same methodology could usefully be extended into and between other Regions.

Meaningful research in some of the above areas is hampered by water companies’ perceptions of commercial confidentiality. Examples include effectiveness of metering/demand management and scope for water sharing.

1.4 Is the response of the Government, the EU, regulators and industry adequate?

In theory, the present water management setup provides a reasonable balance between the pro-development lobby, particularly the water companies, and the demand management lobby, primarily the Environment Agency and Ofwat. However, there is a weakness on the Government side in having no strong advocate for development to ensure that the country’s basic water needs are being met. In our view, the Environment Agency over-emphasises the benefits of demand management and does not adequately recognise the importance of new development to ensure adequate supplies are available to meet new and existing customer needs. This is partly as a result of its role as the environmental regulator. Ofwat is strongly motivated to keep water prices down and therefore tends to be anti-development. Ofwat also has a tendency for a short term view corresponding to the five year regulatory period, which is too short for the timescale required to develop new resources.

It is an obvious point, although sometimes overlooked, that water resource shortages only become evident during droughts. In most years the English climate provides plenty of water. It is only when droughts strike that we realise that demands have outstripped the drought reliable water resource. Do we have to wait until the next major drought before panic action by Government? The recent experience in New Orleans highlights the danger of becoming dependent on the non-occurrence of recognised climatic risks.

Despite criticising water companies for their high leakage, Ofwat’s short term view and determination to keep water prices down is now preventing water companies from taking the action which would have the biggest impact on further reducing leakage—replacing our ancient and deteriorating water distribution networks. At present, Ofwat’s approach to determining the extent of mains replacement in water companies’ capital programmes is to base it on the economic level of leakage—the point at which leakage control, including mains replacement, becomes more expensive than developing new sources. As a consequence, the average age of water pipes is increasing.

An alternative approach to a sustainable water network might be for Ofwat to establish a credible average age of pipe-work which could be maintained at reasonable cost but will need significant investment to achieve. For example, if an average age of 50 years was determined with a strategy of say 25 years to achieve, then a sensible and reliable funding strategy to deliver this could be established. We understand that in the Thames Water region the current rate of water main replacement of around 300km/year might need to be doubled to achieve such an aim and this would add significantly to customer bills.

There is scope for government to demonstrate more pro-actively the political will to manage water demand. For example:

— Building regulations should be amended to ensure new houses are water efficient.

— Means of implementing metering more quickly should be explored, whilst avoiding the pitfall that volume-related charging may encourage water companies to abandon water efficiency in favour of maximising volumetric sales.

— Scope should be explored for introducing innovative tariff structures in the non-household use sector, which will drive down demand.

The current issues of water management planning are further compounded in the absence of a “water and land management policy”, which incorporates the government’s vision of freshwater resource sustainability and how stakeholders would be expected to respond to recent national and European legislation.
2. Supply and Demand

2.1 What are the options for increasing water supply and what are the arguments for and against?

The options and their arguments for and against can be summarised as:

- Further ground water development—relatively low cost, but environmentally damaging particularly in terms of low river flows in the south of England. Unlikely to be much potential for further development.

- Desalination—an inexhaustible source and costs are falling to a level not dissimilar to development of new reservoirs, but high energy usage and consequent greenhouse gas emissions makes it unattractive in sustainability terms (unless there is a big move towards nuclear power).

- Recycling of sewage works effluent—some potential when the geographic setup is favourable. Recent commissioning of Essex & Suffolk Water’s Langham recycling scheme (on the Chelmer downstream of Chelmsford) has moved practice forward from the less direct recycling than has taken place historically in the Thames basin.

- Storage of winter rainfall and river flows in reservoirs—the classic solution, but with about 20 years needed to identify, promote and construct a new project, not a quick fix. There are likely to be major difficulties in obtaining planning permission and public support. The perception of large environmental impacts is probably overstated—most existing reservoirs become popular with both wildlife and the public. Many have acquired protected environmental status, for example becoming Sites of Special Scientific Interest (SSSI) or Ramsar sites. Over a million people a year visit Carsington reservoir for recreation and several other reservoirs attract large numbers.

The options for increasing water supply security are encapsulated within the government’s twin-track approach. Factors to be considered in arguments for and against the promotion of options for water supply security should include: levels of service, the relative magnitudes of water delivered and economies of scale, and sustainability.

2.2 What are the likely future trends in water demand management, and what can be done to manage demand more effectively, and to influence the behaviour of customers and others?

Future water demand trends are well covered by water company business plans and the Environment Agency’s national overview. There is a high degree of uncertainty in these demand estimates which water companies commonly base on projected population and property growth, assuming current consumption rates.

The actions most likely to be effective in managing future demands are:

- Reducing leakage by a larger investment in replacing water distribution networks in the water companies’ business plans, as mentioned earlier.

- Rapid increases in water metering (maybe even compulsory water metering for all properties as is the case in most developed countries), combined with volumetric water charges designed to penalise high household consumption—such a system will drive improvements in the efficiency of domestic water appliances, design of houses, etc. Without water metering and appropriate tariff structures, the behaviour of consumers is unlikely to be influenced.

- Changes to the Building Regulations to promote more efficient water use (e.g. via smaller WC cisterns, grey-water recycling, rainwater collection etc).

Demand management measures need to be economic, realistic and realisable. Over-dependency on unrealistic expectations of demand management is a threat to the future security of water supplies, especially taking account of the time needed to develop new sources if demand management does not materialise. For example, studies of use of retro-fitted smaller WC cisterns have shown 8 per cent savings in water use; however, when offered to 50,000 householders at £20 per cistern, only a handful took it up.

2.3 What contribution can science, engineering and technology make towards reducing water use or waste by households, businesses and the public sector?

Probably not a lot, until there has been a big increase in the amount of domestic water metering and charging by volume. Then market forces will create a need which existing engineering, science and technology will fill, for example through more efficient white goods and rainwater harvesting on properties.
3. Infrastructure

3.1 What is the current state of the water supply and drainage infrastructure? Is there sufficient investment in its improvement?

Apart from the underground assets (water and sewer distribution networks), the existing water and drainage infrastructure is mainly in a good state and well maintained by the water companies. However, as a consequence of regulatory pressure to obtain best use of existing resources before developing new ones, it is operating closer to capacity for more of the time than was historically the case (see earlier comment about sustainability against the need for excessive restoration investment by future generations).

For many years, there has been gross under-investment in the replacement of our “underground assets”. Until the Government recognises this and grasps the political nettle of the need to increase domestic water charges to pay for pipe replacement, the situation will get worse.

The current state of the water supply and drainage infrastructure means that there is a continuing need to maintain an increasingly complex and mature water and sewerage asset base of the water and sewerage undertakers in the UK. Since privatisation of the Water Industry in England and Wales, water and sewerage undertakers have invested large sums of money to maintain their assets and to make necessary improvements to infrastructure associated with adequate levels of service to customers and discharges to the environment. These improvement programmes have involved a higher proportion of short and medium life assets, such as automatic monitoring systems, than in the past. This means that assets have to be replaced more often and many of the short and medium life assets installed since privatisation in the late 1980s will need to be replaced or modernised through sufficient investments, in the medium to long term.

4. Context

4.1 The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at national and European levels adequate?

The legislative and regulatory framework is fine. The problem lies in Government’s reluctance to:

- Explain the need to the public for higher water charges leading to more investment in both new water sources and replacement of leaky pipe systems to avoid the water shortages, which will inevitably occur, particularly with climate change.
- Encourage Ofwat to give more emphasis to ensuring the adequacy of water companies plans for future supplies, rather than excessive focus on keeping prices down.

4.2 How does water figure in the development of Government policy in areas such as housing, land use planning and industry?

As referred to above, the Government should give a much higher profile to water related issues in putting forward proposals such as ODPM’s Sustainable Communities planned 800,000 new homes in the south east. We note that the ODPM has stated that water use in these homes will be 25 per cent less than current average, but we are sceptical about whether this will be achieved unless there is a major drive to raise public awareness, coupled with water charging incentives. This would help to improve the public acceptance of the need for investment in improving the supply demand balance and associated water charges.

4.3 What can the UK learn from the experience of other countries?

Compulsory domestic water metering and intelligent tariff structures as referred to previously is in widespread use in most developed countries and could usefully be introduced here to provide real demand management incentives to water users. However, related charging policy must be framed in a way that will not encourage companies to abandon water efficiency considerations in favour of maximising volumetric sales.

Recent national and European legislation eg the Water Act 2003 and the Water Framework Directive adjusted previous legislation in order to promote sustainability and water conservation. Under the Water Act, companies’ resource plans and drought plans will become public documents liable to consultation and
challenge processes similar to local structure plans etc. This presents an opportunity to promote public debate on water as a valued resource. Experience of countries such as Japan, Singapore, France, Germany, USA and South Africa in the area of water and land management policy development and implementation would be beneficial.

**October 2005**

**Examination of Witnesses**

Witnesses: **Mrs Sue Sida-Lockett**, Chairman, East of England Regional Assembly, **Mr Brian Stewart**, Chief Executive, East of England Regional Assembly, **Mr Paul Woodcock**, Regional Director, Environment Agency Anglian Region, **Mr Lawrence Wragg**, Regional Chairman, East of England, Campaign to Protect Rural England and **Mr John Canton**, Regional Manager, East of England, Institution of Civil Engineers, examined.

**Chairman:** May I welcome this impressive team who are joining us for the first session this afternoon? Before I start, I should just note that there is a public notice giving the terms of our inquiry and the declared interests. I must declare in addition that I am a member of the Campaign to Protect Rural England and I know others are too.

**Baroness Platt of Writtle:** Yes, I want to declare that I am a member of the CPRE. I am also an honorary fellow of the Institution of Civil Engineers and I live in Essex.

**Lord Howie of Troon:** I am a proper fellow of the Institution of Civil Engineers.

**Q651 Chairman:** I wonder whether you would like to introduce yourselves one by one.

**Mr Stewart:** My name is Brian Stewart and I am the Chief Executive of the East of England Regional Assembly.

**Mrs Sida-Lockett:** I am Councillor Sue Sida-Lockett. I am Chairman of the Regional Assembly, and have been for two and a half years, and I am Deputy Leader of Suffolk County Council and have been an elected County Councillor for 21 years.

**Mr Woodcock:** I am Paul Woodcock. I am Regional Director for the Anglian Region of the Environment Agency.

**Mr Wragg:** I am Lawrence Wragg. I am Chairman of CPRE for the East of England Region and a trustee of CPRE nationally.

**Mr Canton:** My name is John Canton. I am Regional Manager for the Institution of Civil Engineers in the East of England.

**Q652 Chairman:** Thank you very much. You will gather, because you are particularly interested in the Anglian region, the East of England, we shall be concentrating particularly on the regional issues of that area in this session. Does anyone want to say anything by way of introduction or should we go straight into the questions that we should like to ask you? Mrs Sida-Lockett?

**Mrs Sida-Lockett:** Thank you. I just wanted to update you on what is happening as of today. What we have is the Examination in Public of the East of England plan and it is discussing the means of gaining greater water efficiency, including the possibility of a 25 per cent efficiency target in all new developments in the plan. That is happening today and the Examination in Public is finishing this Thursday. I also should like to inform you that as the East of England Plan has been going through the Examination in Public, the Regional Assembly has suspended its support for the plan whilst seeking firm assurances from the Government that the funding for the necessary infrastructure is assured for the life of the plan. Those assurances have not been received at this time.

**Mr Canton:** May I make a brief statement about the Institution of Civil Engineers for those members of the Committee who are not engineers and may not be familiar with the Institution? The Institution is the oldest professional institution, representing over 70,000 professionally qualified civil engineers worldwide. Members are responsible for the design, project management and construction of everything we see around us in the built environment, bridges, roads, ports, power stations and, of course, water treatment works and associated infrastructure installations. As regional manager of the ICE, I am responsible for representing 5,000 engineers in the region and the policy that I present is derived from specialist boards of the Institution. As such, I hope you will appreciate that I am a spokesperson who may not have detailed expert knowledge of every issue which you may discuss this afternoon.

**Q653 Chairman:** I do assure you that we do not expect everyone to answer every question. It clearly would take a very long time if that were the case, so I do encourage a degree of specialisation in these matters, if that is possible. If there are no other introductory observations, shall we go straight into the questions that we should like to ask and I perhaps could ask the first question? This is particularly
directed at the Regional Assembly representatives. To what extent are you satisfied that the plans to develop some 478,000 new homes in the East of England by 2021 show due regard to the implications for water supply and sewage disposal?

Mr Stewart: We are broadly satisfied that we did take these matters into account. The whole exercise of preparing the East of England Plan, which was the first of the new spatial strategies to come forward under the new planning process, has been a very collaborative opportunity and we are grateful to colleagues, particularly in the Environment Agency, for helping us to shape the draft content of the plan. The plan has reached the stage where it has been tested through the Examination in Public, but the whole process of its preparation and the process of offering it to widespread consultation means that we think all the key issues that need to be looked at have been looked at. What I should say is that since we submitted the plan to the Government in December 2004, there is some greater public interest in matters of water and sewerage and particularly matters which have received widespread press publicity in the last couple of weeks about possible impending restrictions on water usage. It has been creeping up the public agenda. Obviously, we are only one player in quite a complex network of players who have an interest in this matter. As a regional assembly, we are the regional planning body, it is our job to try to narrate such matters as we can in the regional plan as key regional policy, but a great deal of the detail then falls to local authorities so that when they bring forward their local development frameworks for consideration, we shall be asking them to narrate some of these key issues more clearly and in the particular circumstances which individual local authorities face locally about taking particular issues on board. We know there is quite a patchy problem across the east of England and there are particular problems of water supply and abstraction towards the south of the region. We have been particularly concerned about some of the impact of growth proposals in specific geographical locations in parts of the east of England and to be sure that the fairly ambitious levels of growth which the East of England Plan proposes do not lead to problems. If I may summarise, what we have heard throughout the plan process is that while there will be challenges there are no show-stoppers in terms of the levels of development which are proposed in this plan.

Q654 Chairman: The perception of the public at the moment is that there appears already to be a water shortage in the region, particularly, as you say, in the southern part of the region. There appears to be up to half a million new homes to be built and also, incidentally, there is a requirement to conform to the Habitats Directive in ways which have not yet been fully measured. Add to that the complication, and it is a complication, of the yet unquantifiable implications of climate change, put all that together, how are you expecting these half a million houses or so to be supplied adequately with water?

Mr Stewart: Firstly, it is fair to say that around half of the 478,000 houses already have planning permission, so these issues should already have been dealt with. We deal very much in the currency of new houses actually built and the East of England Plan proposes that 23,900 new houses will be completed every year between 2001 and 2021. As we sit here today in 2006, some of the houses that will score against the plan’s target have already been built. We are not aware of any single problem of any particular development not being able to be connected to the water supply. Obviously water companies have a particular duty to look something like 25 years ahead to make sure that they have the capacity to deal with these issues. All we know is that in certain places there will be particular challenges about making sure that the necessary investment in water and sewerage facilities takes place at a time when the development is likely to be triggered in terms of the East of England Plan. I can assure the Committee that we have weighed issues about climate change and we have weighed the issues of the need to protect the environment of the East of England, which is very precious, but there are other considerations. As a region we have failed in the past to make the necessary provision of housing supply and that is leading to very, very serious affordability issues. You need a household income of £51,000 in the East of England to be able to afford an average house. The average price of a house is now over £200,000. We have had to weigh up these important water and sewerage supply issues and I should repeat what I have said that all the advice we have had is that while there are challenges, there are no show-stoppers.

Mr Woodcock: I wonder whether I might just help with that. Brian is right that the plan has been developed in a very collaborative way. The Environment Agency has been part of that and pleased to be part of it. We do welcome the policy on water supply and management and drainage, ENV9. What I should point out is that there are two key dependencies in terms of development in the region. One is that new water resources are developed. There are two primary schemes set for development in the region. One is known as the Abberton Trilogy, which is due to supply water down into the south of our region, into South Essex and support Thames Gateway. The second is the development of Wing water treatment works in the west of our region, which is about supplying the M11 corridor, the top end, and also Milton Keynes and South Midlands.
There is a dependency to make sure those develop otherwise there will be problems in terms of water availability in the future. There are still some permissions outstanding for both those schemes. The other key dependency is demand management. So we have a twin-track approach: one is resource development, the other is demand management. What we are calling for in the plan is that the demand management element is acknowledged and we are seeking to have a 25 per cent efficiency built into new homes compared with old homes. We see that as an important aspect of the plan as it moves forward. We are also very keen that the East of England plan acknowledges the need for full and proper studies to be done of public health and water infrastructure prior to development. We have the support of the Regional Assembly in this. Essentially, it would require local authorities to prepare local development frameworks to identify, through a water cycle study, what the water infrastructure needs are, that is water resource and sewerage and sewage treatment facilities. In fact, some of the pinch points that Brian has referred to in the south of our region refer rather more just at the moment to the capacity of sewage treatment works than they do actually to water resource availability.

Q656 Lord Lewis of Newnham: You tell us where you are going to get these developments, but you do not tell us how it is going to be accomplished. Is this going to be with reservoirs? Is this going to be going underground or is it going to be desalination? What is going to be the method?

Mr Woodcock: The two schemes proposed at the moment are being developed by the water companies: Essex and Suffolk Water Company for Abberton and Anglian Water Company for Wing water treatment works. Abberton is an existing reservoir, the banks are going to be raised on it to create greater capacity and the plan is to pump water from Norfolk into Essex to supply that reservoir. Wing water treatment works is about extending existing water treatment works and making greater use of the capacity of Rutland Water reservoir than at present. So no new reservoirs: just better use of existing reservoirs.

Q657 Baroness Sharp of Guildford: May I pick up the point that Councillor Sida-Lockett made in her introductory remarks? You were talking about having withdrawn your endorsement at the moment with a proviso about the funding of the infrastructure. Could you explain the linkage between these two points here? I take it that you are concerned about the infrastructure and the provision in particular perhaps of sewage works.

Mrs Sida-Lockett: Indeed. Infrastructure is a word that tends to look at roads, but we are using infrastructure in its broadest sense which is across all the facilities that you need to make people live in good, pleasant and healthy surroundings. We have some significant concerns about the undoubted increase in homes that we are being asked to build by the Government and the lack of infrastructure funding. It has not started to come and we have some concerns that it may not happen, in which case we shall feel unable to promote the plan in that we shall have a review and monitoring system with the plan and if the infrastructure needs are not addressed, then we should not feel able to support the increased housing. But, particularly on water, these are issues for the water companies to deal with and I would refer you to those.

Q658 Baroness Sharp of Guildford: The infrastructure funding for water and sewage is actually met by the water companies, not by local authorities.

Mrs Sida-Lockett: Indeed; yes.

Q659 Lord Oxburgh: Can you tell me whether the reservoir, the walls of which are being raised, has been full every year in the last 10?
Mr Woodcock: No is the answer to that, it will not have been full every year in the last 10 and the ability to fill it depends on the availability of water in the River Ouse system. Water might not always be available in the new system, but generally speaking it is.

Q660 Lord Oxburgh: If we are therefore heading for a period of reduced rainfall, raising the walls of the reservoir may not help you.

Mr Woodcock: Generally speaking winter water is more available than summer water and so storage of water is a more effective mechanism to deal with climate change than is reliance on ground water. There is a heavy reliance on ground water in the south of our region currently, so switching to surface water is probably an advantage in climate change terms.

Q661 Lord Lewis of Newnham: How were you actually consulted by the Office of the Deputy Prime Minister in the formation of their plans for sustainable communities in the East of England and by the East of England Regional Assembly in the formation of the draft East of England Plan?

Mr Woodcock: We have been involved essentially through the development of the East of England Plan through from RPG9 and RPG6 which were the old South East and East of England Plans through to RSS14. We were heavily involved in that process and we have provided advice and information as that has developed. As the numbers and locations of new developments have become clearer in the latter stages of the process, the pinch points in terms of inadequate sewage treatment, drainage and to some extent water resources have become clearer. ODPM have involved us closely in the Milton Keynes/South Midlands arrangements through the inter-regional board they have established there to develop governance across the sub-region. This arrangement has been quite a successful governance mechanism for ensuring that growth proceeds in the right way. For example, a number of sub-committees have been set up on utilities’ development and on essential infrastructure which have helped a meeting of minds around the South Midlands and Milton Keynes proposals. As a result of that a number of water cycle studies on infrastructure needs have been kicked off in Milton Keynes and South Midlands.

Q662 Lord Lewis of Newnham: How far have the public been involved in examining these particular proposals?

Mr Wragg: The answer is really quite crisp that the Sustainable Communities Plan was developed without any consultation with members of the public or organisations like the CPRE. What has happened subsequently in the development of the draft East of England Plan is that there has been proper consultation and the CPRE has been very fully involved in that and is fully participating in the Examination in Public which is going on as we speak. We therefore see something of a democratic deficit in the Sustainable Communities Plan itself. We do not see that in what has happened to the draft East of England Plan, where we are more than satisfied with the way the consultation has taken place. We feel that economic growth and housing have been allowed to be the tail that has wagged the dog of all other considerations and that the environmental issues, particularly the issues to do with the supply of water and the treatment of sewage, have come in rather later in the sequence than we should have liked. One has to put this in the context of the region which is the driest in this country and has the greatest commitment of existing summer groundwater. We do not have a lot of spare capacity as things stand with the present population, so we are less sanguine than some of my colleagues on this table would be about the ability to meet the future demands of the postulated growth without damage to the environment and to the lifestyle of people who already live there.

Q663 Lord Howie of Troon: Would you agree with me that portraying adequate housing as the tail that wags the dog is somewhat cavalier approach to a very important social problem?

Mr Wragg: I would not, for a moment, allow myself to suggest that not providing proper housing was not one of the biggest priorities. CPRE has been consistent for many years in calling for more affordable housing where it is needed. That is not to say that we call for housing to be built wherever it suits the developer for commercial purposes. We should like to see housing put where it is needed. Part of the features of the so-called Sustainable Communities Plan is that it is dealing with what used to be called London overspill and we question whether it is the best way of doing it.

Q664 Baroness Perry of Southwark: As part of the Government’s response to the Barker Review of Housing Supply they claim that meeting their target of 200,000 net additional units of housing per annum within the next decade will only result in a 0.1 per cent increase in total water use. I should very much like to know whether you agree with that or what your opinion of it is and, in particular, what you think of their further comment that water use is “primarily driven by population, which is largely unaffected by housing supply”. Do you agree with that and will it apply in the East of England?
Mr Wragg: If you are addressing that question to me, that is a technical question which lies outside my expertise.

Mr Stewart: It is fair to say that we were surprised at how low that figure actually was. Common sense would show that if you have a region like the East of England which is forecasting to have 478,000 new houses and something like 648,000 extra people by 2021 and with the increasing number of single-person households and people’s rising lifestyles in terms of their use of water, we were surprised that the figure was as low as the Government have reported to you. We should have expected it to be somewhat higher, but it may well be that the government figures have already factored in some major assumptions about water resource constraints and using less, which is after all part of our twin-track approach, as well as perhaps factoring in some assumptions about increasing supply. We were surprised by that figure.

Mr Canton: Water demand has historically been based on litres per head per day; that is the way it is normally calculated. In practice, the actual use varies depending on people’s water-related behaviour within the household, for instance garden irrigation, car and pressure washing will substantially increase the average per household use. The other observation is that it is not the whole truth to say that population primarily drives demand. That population primarily drives demand is true, but it is not the whole truth. The reason for this is that part of the predicted housing need associated with population growth depends on the fact that the average household size is reducing. The figure in 2001 was 2.38 persons per household and that is projected to be 2.24 by 2021. The implication of that is that 1,000 persons occupy 420 households in 2001 but 446 in 2021 and that is an increase of 6 per cent. We think that the 0.1 per cent reduction is not right and we in fact expect a significant increase in demand as a result of this population growth and as a result of the reduction in average household size.

Chairman: Have you been able to quantify the figure yourselves?

Mr Canton: The only figure I can quantify is the 6 per cent increase in the number of households per 1,000 persons and the fact that, as more houses get dishwashers, power showers, et cetera, unless we take active measures to reduce demand, it is very unlikely that the point one per cent is right.

Lord Howie of Troon: This apparently small increase, which surprises me too, is the increase in total water use, that is not merely domestic, it is industrial and commercial as well. Is it possible that the Government expect to see a decline in the use of industrial and commercial water as against a potential increase in domestic?

Mr Canton: The observation of the ICE was that it appears that the water companies are making no allowance for non-household water use associated with economic growth, that is commercial and industrial users, so they appear to take an account of population growth, but not of the associated economic growth, which is an essential part of what we now define as sustainable development.

Lord Oxburgh: What assumptions have been made about whether these nearly 500,000 houses will have gardens or not, because gardens are heavy users of water? What assumptions have been made?

Mr Stewart: The prevailing assumptions are that we shall have increasingly high density developments, but we are encouraged to follow the Government’s line that we need to provide for sustainable communities, places where people want to live and I am sure that the majority of houses will have gardens.

Chairman: Even a patio is quite a heavy water user, is it not?

Mr Woodcock: We have the advantage of having done some studies on just what water is likely to be used with the roughly 500,000 increase in houses in the region over the next few years. Our estimate is that water usage will increase by about 10 per cent by the end of the plan period. That takes account of the water efficiency measure I mentioned earlier, which is the 25 per cent built into new build, so it is a fairly significant increase in water usage.

Baroness Perry of Southwark: When you were doing those calculations, did you take a figure for the way in which households use water or were you doing it on a formula for so many new houses regardless of the increase in population? The Government’s argument is that water use is driven by population and population is unaffected by housing supply because you get a couple living together, they split up and they have two houses instead of one and so on.

Mr Woodcock: It is not a straight calculation in that way. What we have done is factored into the equation some considerations around the increased use of water in single-occupancy houses. Some account has been taken of that.

Baroness Perry of Southwark: This is the two dishwashers, two gardens argument.

Mr Woodcock: Yes. Currently water usage is about 150 litres per head per day. What we have done is factored that in at about 120 litres per head per day which takes in water efficiency considerations plus a bit for single-occupancy houses.
Lord Lewis of Newnham: I find these figures rather alarming. 0.1 per cent and 10 per cent are really quite significantly different. How far is this going to influence all we have been hearing earlier about potential plans? What sorts of figures were used in making the predictions that we were going to be able to cover this housing problem?

Mr Woodcock: There is a water resource plan which stretches out 30 years and takes account of the 10 per cent increase in water usage in the region. Provided we have this twin-track approach, the water resource developments that I have already mentioned plus water efficiency (25 per cent in new build) then the 10 per cent increase ought to be able to be accommodated within our understanding of the resources which are available within the region. It is going to be tight and, as I said, there are some key dependencies. For example, Abberton has not got all its permissions yet, nor has Wing and we must ensure that efficiency is built in.

Lord Oxburgh: Does that 30-year plan take account of the potential changes in supply associated with climate change?

Mr Woodcock: Yes, it does.

Lord Howie of Troon: The ICE told us that there is “no strong advocate for development of new resources to ensure that the country’s basic water needs are being met”. Do you believe that the necessary resource developments will take place in time to meet the future water demands in your region?

Mr Canton: The simple answer is no, we do not currently. The issue which has been skirted around at the moment and needs to be addressed is that whereas at one time the concept was that balanced development was what was sought and needed, what has come out of the Examination in Public—and may I congratulate EERA on the Examination in Public which has been a really valuable exercise—what has evolved from it is that in fact it is environmental limits which should dictate the extent of development and the concept of balanced development in fact is no longer appropriate. People think that balanced is good because it sounds compromising and comfortable, but in fact what we are now realising is that environmental limits have to be recognised. To refer back to the earlier conversations on Abberton and Wing water treatment works, which is in fact in association with the extension of Rutland Water, the Institution’s position is that those developments are essential if we are going to proceed with the planned rate of development. What I should refer you to is Sustainable Water Management and Land Use Planning. This is a report produced by CIRA and DTI in London in January 2006 and the main thrust of that advice is that if you cannot produce a sustainable water management strategy to support the planned development, then you review the planned development and the Institution of Civil Engineers believes that is where we are at. We strongly recommend the development of Abberton and Wing water treatment works, but only subject to there being no overriding adverse environmental impact. Norfolk County Council are particularly concerned that if we do develop South Essex and continue in the way in which we are doing in London Gateway at present, then we shall find ourselves in a very difficult situation because the Ouse will be at a situation of low flow, the water supply to Abberton will depend on extraction from the Ouse and which way will we go? That is the issue that needs to be addressed. At the moment, sustainability of development in the East of England depends on inter-regional transfer and we have to question whether that is sustainable. To move water is not the same as moving electricity. It demands enormous energy inputs. One cubic meter of water weighs one tonne. To pump a tonne of water 50, 100 miles is enormously expensive in terms of energy and I strongly recommend that the Environment Agency and EERA review whether the currently planned water management strategy is truly sustainable.

Chairman: At present there is this dependence on the transfer from Norfolk down to the south of the region. There is likewise, is there not, transfer from outside the region, from Severn-Trent into the region? Are there any plans to increase transfer or to reduce transfer or is it assumed that it will remain the same?

Mr Stewart: We have assumed that it will broadly remain the same, but it is up to the individual water companies together with the Environment Agency to keep that matter under continuous review. One of the issues here in terms of the answer to the last question is perhaps some of the problems around the existing regime whereby the window that the water companies have to work towards is quite low in terms of the long lead-in times to gather the investment for some future developments. I understand that the water companies work to something like a five-year advanced funding regime where they have to work with the regulator and we do know that the water regulator, acting on behalf of water customers, does not always see eye to eye with the likes of the Environment Agency in terms of the need to ensure that there is future investment. Those are important issues.

Lord Howie of Troon: Do you think that the two projects mentioned are inadequate to deal with this problem?
Mr Canton: My answer to that is that I do not know the details. What I do know is the principle. As has already been mentioned, the East of England is the driest part of the UK and the interesting point is that the Abberton reservoir cannot be filled from the rainwater on that catchment. That is a significant point. The only way is which Abberton reservoir can be filled is by inter-regional transfer; we have to take water off the Ouse and pump it to Abberton. I am quite clear on the principle; on the detail of whether it is adequate, may I draw an analogy? Flood defence and flood alleviation is now being planned using the precautionary principle that the past is not necessarily a good guide to the future and that we are entering a period of climate change. The way in which one designs a reservoir depends on historic records of climate, you design for a seven-year drought, you know what your demand is, you know over a seven-year drought period what the inflow to that reservoir could be and the reservation that I am making is that faced with a period where perhaps the past is not a good guide to the future, should we not be being a lot more cautious about how we plan our water supply for the East of England?

Lord Howie of Troon: I must say I rather like the past: it seemed to me to work quite well.

Q676 Lord Oxburgh: The East of England Plan puts certain responsibilities on local authorities and contains the words “require the introduction of water conservation measures and sustainable drainage solutions”. What exactly is meant by that and how confident are you that the local authorities will indeed pay sufficient attention and achieve the water savings targets on the basis of which the plan has been made?

Mr Stewart: One of the roles of EERA as a regional planning body is to certify, when the local development frameworks come forward (which are the new successors to local plans drawn up by the local authorities), that the plan content is in general conformity with the final regional spatial strategy. So there is a link there and we shall expect local development frameworks fully to live up to the final shape of the policies in the East of England Plan, including, we hope, an improved policy ENV9. In addition, some work has been done by EERA, the Environment Agency and the Sustainable Development Round Table to provide them with draft supplementary planning guidance which gives them a kind of over-ready off-the-shelf approach to taking these matters forward. We look forward to as many of them as possible actually replicating that in the plan and if they do not, then their plans will not be signed off as being in general conformity.

Q677 Lord Oxburgh: Earlier, reference was made to a 25 per cent efficiency improvement. Do you have a clear idea of how that is to be achieved? How was that number arrived at?

Mr Stewart: That number was arrived at largely with the help of the Environment Agency. They may be able to give some more technical explanation.

Q678 Lord Oxburgh: Perhaps the Environment Agency could be helpful here.

Mr Woodcock: I shall try to be that. The 25 per cent has come from some research work that has been undertaken by the Environment Agency. What has been demonstrated through the normal water-saving devices which are available now, dual-flush loos, water efficient showers and taps, is that 25 per cent efficiency can be achieved very readily, interestingly at no additional cost to the developer.

Q679 Lord Oxburgh: Whose responsibility, may I ask, will it be to ensure that these are installed, because we have had a very poor record of compliance with building regulations in this country?

Mr Stewart: Indeed. The next part in the chain is that an individual developer seeking a planning consent from a local authority will only have that application approved if the actual detail complies with the policy of the local development framework. You can see that there is something of a hierarchy: regional spatial strategy; local development framework; and then an individual developer comes along seeking his planning consent. Obviously, if the developer does not cooperate, the local authority will reserve its right to refuse planning permission. Of course we then need the help in all of this of the Planning Inspectorate; they will be supportive of all of the background policy framework in determining any individual appeals. That is another area where, if you will excuse the pun, there has been leakage in the system in the past.

Q680 Chairman: If you are going to have any confidence in this 25 per cent efficiency target, you really have to have a track record where a community of some size, albeit a new development, has achieved these rates. The Environment Agency may say that in theory it is possible, but in practice we have heard evidence of how very heroic attempts have been made to get people to conform to these lifestyle changes and if they achieve something half this rate, they think they are doing very well. Is this figure of 25 per cent a pious hope?

Mr Stewart: It is not a pious hope. If we are going to get public opinion to take this whole matter seriously, we do have to be somewhat aspirational and there have been some examples where, on a limited geographical basis, it has worked well. We would
instance Milton Keynes, which is just outside the East of England but which has a heavy influence over the East of England, where there have been some very good examples of doing it.

Q685 Baroness Sharp of Guildford: You talk about new building regulations. Our experience, when we were looking at energy efficiency, was that the problem with the building regulations was not so much that they were not there written into the plans, but that the actual implementation at the developer level and the inspection system was very deficient indeed and they were often adhered to in the breach rather than in practice.

Mr Stewart: Yes.

Q686 Lord Oxburgh: May I ask whether any of the organisations at the table here have the intention of monitoring the performance of these new building developments which, as you pointed out, will be spread over the next 20 years with the possibility of feedback and change of approach if these new targets are not being met?

Mr Stewart: We certainly have plans, as part of our whole approach to monitoring the progress of the East of England plan, to monitor against a wide-ranging basket of indicators. We shall be concerned to monitor how many houses have actually been built, how many jobs have actually been created and we have also signalled to the Examination in Public that we should be very happy to try to develop, with our partners, a limited range of environmental indicators and water consumption, water resource management would be the kinds of things that we have in mind.

Q687 Lord Oxburgh: You said that you would be happy. Does that mean you will do it?

Mr Stewart: We have to be careful here. After EERA has submitted the plan to Government, we are not allowed to make any changes to it, even if we wanted to. So we are relying on the panel inspector to make certain that we are familiar with. We have been taking a very optimistic view about present matters in account. Policies. It may be that if you tighten up building regulations and you get the developers to conform to building regulations, you might indeed achieve these targets, but do you not have to take your forecasts according to the previous track record to a certain extent?

Mr Stewart: We do know that the Government intend to introduce new building regulations. We can have high hopes of having more statutory bite to lie behind some of the encouragement which has so far been the case. We also know that the Government have launched a Code for Sustainable Homes. We think that is a good code, but our problem with it is that it is supposed to be voluntary. If it has any effect at all, it should be mandatory and certainly EERA has reflected that in its response to that consultation.
Mr Woodcock: We have been working with EERA to try to translate this 25 per cent aspiration into something that is more akin to litres per head per day.

Q690 Baroness Platt of Writtle: This to the Institution of Civil Engineers. What potential do you see for water re-use as a means of augmenting supply in the growth areas, whether it be recycling of sewage works’ effluent or re-use of storm water and roof water?

Mr Canton: The answer to that is that we see enormous and unencumbered potential for re-use of storm and roof water. CIRA publication 539 of 2001 reported that rainwater systems in buildings with large catchments-to-occupier ratio will provide a positive cost-benefit ratio compared with mains water cost. I use the word “unencumbered” because the same recommendation does not quite apply to grey water re-use, where there have been problems of reliability and a high demand on operator maintenance which means that at single domestic unit level, the technology needs to be improved in terms of reliability and maintenance. However, to give an example of the sort of savings that can be made, a recent BREAM, Building Research Establishment Assessment Method, study reports savings on a whole-life water bill cost of 71 per cent for a naturally ventilated office, which is the type of building which has the high ratio of catchment to occupant.

Q691 Lord Taverne: Seventy-one per cent of what? Mr Canton: Of cost, of the whole-life cost of water supply to that building. It implies a reduction in demand of 71 per cent and the type of measures they were using for that are low flush toilets, aerated taps and rainwater recycling. That was achieved even without grey water re-use. To support the observations of the members of the Committee, we need as many weapons in our armoury to tackle this problem as possible and the regional spatial strategy has set an exemplary background for how “sustainable” development can take place, but it needs to be very strongly endorsed by the building regulations. If we do not get it in the building regulations, people will not do it. Even if we do get it in the building regulations, the take-up is limited. To comment on the point about voluntary demand management, a study is quoted in ICE’s written submission that says that studies of retro-fitted smaller WC cisterns have shown 8 per cent savings in water use. However, when offered to 50,000 householders at only £20 per cistern, only a handful took it up. Unfortunately, voluntary does not seem to work and from my experience in flood alleviation, PPG25 did not even start to work until section H of the building regulations came in and all of a sudden developers could not use their first point of call as connection to the drainage network, they had to look for on-site sustainable drainage before they could simply connect to the sewer network. The message which I should like to give and which I gave to the Examination in Public is that single measures will not work and that if the level of development—and we all recognise that homes are important—is to be achieved and a sustainable water supply, then we need a multi-pronged approach to it.

Q692 Lord Howie of Troon: You say that there is enormous potential. Does this mean that you might modify your answer to my question a little time ago, when you seemed somewhat dispirited?

Mr Canton: There are two questions. This question is very specific about the potential of water re-use and in pre-discussions with my colleagues before we went into the chamber, we were discussing the fact that one of the members has a house in Antigua where her water supply is solely derived from rainwater collection. Another quoted another example is in the Mediterranean. On my last holiday in the Lake District the sole water supply for that remote Lakeland upland farm was water collection. The industry is responding to this. Marley have recently produced a product which acts as both a sustainable drainage system and as a potential for re-use. During heavy rainfall water goes into a soakaway and can recharge the aquifer. In times of drought a proportion of that water is retained in this tank and can be re-used and used as a source of flushing for WCs et cetera. The potential is there, other countries demonstrate that potential, but until it is enshrined in building regulations and indeed supported by the regional spatial strategy, local development frameworks, all the rest of it, it will not happen.

Q693 Lord Howie of Troon: I have seen this in operation in Bermuda myself. My question was whether this was making you more sanguine. Was it making you happier?

Mr Canton: No, not until it is achieved.

Q694 Lord Howie of Troon: Should it not?

Mr Canton: As the CPRE have observed, there is a danger that we sleepwalk into a real problem here. Let us not forget that there currently is a drought, there are already thousands of households in the south-east of England who, in the middle of winter, are on water rationing. They cannot currently use their hosepipes.

Q695 Lord Taverne: You were sounding a little sceptical about the reliability of recycling of grey water at sewage works. On a visit to Essex we were told that on the whole this was being under used, as
far as I remember it, that it was a reliable source of water. Do you have experience on which to base your scepticism?

Mr Canton: My scepticism is based solely on the CIRA report. I do not have personal experience of it. If I may clarify, the technology does exist and can work, but, in much the way that one of the problems with SUDS (Sustainable Drainage Systems) is that they need maintenance, it needs to be maintained. The technology is quite sophisticated. For instance, at BedZED, Beddington Zero Emissions Development, in South London, they use grey-water recycling. My understanding is that what they are doing to achieve that is first of all to filter the water so it goes through a filtration system, which by its very nature means maintenance and, secondly, it is irradiated with ultra-violet light to eliminate pathogens such as E. coli, et cetera. The reason that I have proposed a preponderance of grey water re-use is that you do not have the potential health risks that you do associated with grey water re-use. The grey water re-use, by its very nature, demands a higher degree of treatment. It certainly can be done and if you have a management company that will undertake to maintain the grey water system, as happens at BedZED, with community involvement in maintaining grey water re-use, then my understanding is—and the CIRA report confirms this—that it can work. It has to be recognised that to try to implement that at single household level is where the problems may start to arise.

Q696 Lord Taverne: One of the earlier answers suggested that metering was one way in which one could reduce water use. Would you support the introduction of compulsory metering across the East of England and what long-term contribution would this make to demand management?

Mr Woodcock: In areas of water stress compulsory metering does make sense and clearly some parts of the East of England are an area of water scarcity, particularly the southern part of our region, Essex and that neck of the woods. Our figures have shown that metering can reduce consumption by 15 per cent to 25 per cent but I take the point that there are other figures around on that one as well. We do acknowledge that social safeguards are needed though and these can be introduced through special water company tariffs. What we need to recognise is that metering is a device to induce behaviour change and it is maintenance of that behaviour change that is the key, not just the metering.

Q697 Lord Lewis of Newnham: How far does metering really require observation? I live in Cambridge, I have a house that is metered, but I have no access to see the actual meter; this is done quite clearly by the water company as a whole. I also have a place on the coast and there sitting on my wall is a meter which I can actually look at and see what is happening. There are even more sophisticated smart metering devices which will help you. I do not think the first form of metering is really going to have the same impact as the second form of metering where you can actually see for yourself what the numbers are. All right, you can look at your bills and measure it in that particular way, but even bills are not presented, to my mind, in a very satisfactory way, they do not give you what you had at the last quarter or whatever it is, something associated with it. There is a lot of public requirement here. I remember the time when, for instance, in a totally different milieu, recycling was considered an impossibility, people will not do it, but a lot of education of the public has led them now to be doing this in the most direct manner. Water metering has to undergo a similar sort of public demand explanation.

Mr Woodcock: You are absolutely right: it is a psychological thing. If you have electricity measured by a meter, you are inclined to turn off the lights because you think you are probably saving money, even if it is only pennies. It is the same with water meters: it is the psychological impact of having a meter on your supply which would suggest that you are going to get smaller bills if you turn the tap off. Education is the point and alongside the meter needs to go quite a lot of education about the benefits of water efficiency. Within the region, there are various initiatives (eg engagement of water companies) which are beginning to send these messages out. We do recognise that climate change and development are impacting on the East of England in terms of water resource availability rather more than they are in some other places in the country.

Q698 Lord Oxburgh: I appreciate that this is a matter for the water companies rather than for any of your groups, but would you support the arrangement which we came across in eastern Australia where in fact inverted water tariffs were used so that the first quantum of water was at a relatively low rate and the cost the consumer paid for metered water increased with the volume? Have you any thoughts on that?

Mr Woodcock: That is fine, provided the vulnerable groups are protected. There is a need for that.

Q699 Lord Howie of Troon: Lord Lewis of Newnham drew an analogy with recycling and spoke of education. In the London Borough of Barnet where I live, the education is quite simple: if you do not recycle, you are fined £1,000. Is there a lesson to be got there?
Mr Woodcock: It is behaviour change, is it not?

Q700 Lord Whitty: We have talked quite a lot about building regulations and you clearly are putting quite a lot of stress on building regulations to deliver the 25 per cent improvement in new development or more. More specifically, what do you want to see the Government put in the building regulations and how could they be better enforced than we understand the position has been hitherto?

Mr Woodcock: The Environment Agency’s position on that is that currently the way that Part G, which is the water bit of the building regulations, is drafted it has something like eight to 12 per cent water efficiency savings in there and that is primarily around installing, as I understand it, dual-flush cisterns. What we want is to go some way further than that; some of the points that Mr Canton made around aerated taps, shower heads of a low water usage types and also metering, although this does not fall within the regulations, is another factor driving this efficiency. We want the building regulations strengthened to include a range of other appliances in the home which drive water efficiency.

Q701 Lord Whitty: And what about enforcement?

Mr Woodcock: Enforcement is an issue and I do sympathise with the point that was made over here. It does need to be properly enforced and if we have a set of regulations, there needs to be proper enforcement of those rules.

Mr Stewart: Perhaps there is a lesson to be gained here where the Government recently incentivised the local planning authorities to improve their planning performance. By having a building control version of the planning delivery grant, local authorities could perhaps be rewarded for improved performance on inspection and enforcement of these new building regulations.

Q702 Chairman: I believe there is a pilot scheme to privatisate building inspection. Is this something which commends itself to you? One of the problems is a lack of building inspectors.

Mr Stewart: Indeed, just as we have a severe shortage of planners as well. I was not necessarily thinking of privatisation; I was thinking more perhaps of the local authorities being rewarded in some way for good performance in monitoring these things and helping to deliver their share of this improved performance. That is a way in which everyone would perhaps be encouraged to do a lot better.

Q703 Chairman: Or perhaps on Lord Howie of Troon’s principle, that if they are doing it badly, they should be penalised.

Mr Stewart: Well I should say that when I use the word “reward”, I am using it very generically; sometimes there are carrots and sticks. It would be all part and parcel of the same approach.

Mr Wragg: Two points, if I may, apropos the privatisation of building inspectors? I am always concerned at the thought that a job that important is going to the lowest tenderer. It is never clear to me that that produces the best outcome. The second point on this issue of building regulations: we should like to widen the field slightly and suggest that goods that are water inefficient, like dishwashing machines, should actually be taxed in relation to their water consumption, which might appeal to a government of the day, and that existing homes should be addressed as well. There are more existing homes than there are new homes being built and in order to change people’s behaviour, you might actually have to give them grants to persuade them to put in these £50 kits which would actually be generally beneficial.

Q704 Lord Lewis of Newnham: Would it not be an advantage to have on your washing machine what its consumption is? You do this for fridges and various other features like that where you are using electricity, but as far as I know the water side of it has never actually been involved at all. We were told at the last meeting that in point of fact the more expensive machines were the ones that normally gave you the lower water consumption, but if you did it over a reasonable period of time, it was very cost effective. This is the sort of thing the public have to know.

Mr Wragg: I believe some manufacturers do actually publicise the data and it may indeed be at the upper end of the market that the full data are available.

Mr Canton: We should like to see rainwater collection and re-use as an explicit part of the building regulations and, for instances where appropriate maintenance regimes could be instigated, grey-water recycling. We seriously consider that if we are going to meet reductions in demand which are essential if we are going to continue to supply housing needs, then that type of measure is needed. The other point I should like to make is that ideally we incentivise good behaviour too and that can arise, as has been indicated, when it is not in the consumer’s best interest to do things in what appears to be the cheapest way in the short term, but rather to take an initial higher capital cost that will pay in the long run. I am sure, in the way that people are being encouraged to buy houses which are energy efficient—and a 20 per cent increase in gas prices certainly focuses the mind—the same can be said with water and this is one advantage of metering. When it is quite clear the more water you use the more it is going to cost you, then you are going to
start willingly to put rainwater butts on your
downpipes and water your back garden using
collected water.

Q705 Lord Whitty: All this is fine, except that the
point of enforcement is when the developers
introduce the equipment in the first place. There is no
point of enforcement beyond that as far as the
occupier’s use is concerned. The only chance you
have is to make an irreversible installation in the first
place. If somebody buys a less efficient tap later, you
really have no way of dealing with it, unless you ban
or use regulation to ban water inefficient taps. I am
not sure whether you are advocating that, but Mr
Wragg was advocating fiscal incentives. Actually,
at the end of the day, you would have to have a
regulatory control of the type of water-using
installations and machines, would you not?
Mr Canton: I agree with what you are saying. A
simple observation: in my own observation currently
only about 10 per cent of public conveniences have
dual-flush water systems and, given the option
whether to use a small flush or a large flush, then
obviously the thinking person will save water and
save money by using the small flush. Some
installations will work and if it is in the building
regulations that all new properties must have dual
flush WC’s and they must have aerated taps, then we
shall start to make a dent, but until such time, I do
not believe we shall.

Q706 Lord Whitty: May I just ask you as well about
the Code for Sustainable Homes that you referred
to earlier and which you said you would like to see
made mandatory. Presumably that code goes beyond what
you would want in the building regulations. Are there
specific things which you think are more applicable in
the code that you could not really see in the
regulations? Is there another stage, if you like, gold
plating the regulations by putting it in the Code?
Mr Canton: One thing which has become apparent
and one apparent anomaly is that the building
regulations are currently national and in certain areas
of the country, North Wales, the Lake District,
obviously the sort of water conservation measures
which we are requesting for the East of England
would not be appropriate. Some sort of measure
needs to be introduced whereby regulations can be
region specific, geographically specific and even this
issue of compulsory water metering, all these
measures, could be geographically related.

Mr Stewart: Obviously, the Code for Sustainable
Homes only deals with homes. Building regulations
could obviously deal with other users as well, so it is
important that if we are to take this matter seriously
we do try to address it on a fairly broad basis. It is
important that building regulations are seen as the
key way into this.

Chairman: On that note, we must bring this evidence
session to an end. You have made it very clear from
all your expertise how the specific problems faced in
the future, with the expansion in the eastern region,
are not problems which other regions have to wrestle
with so you will have particular issues and it may well
be that building regulations which are regional and
other regional solutions should be looked at much
more favourably than at present. Indeed you will
gather from the tone of our discussions that we
should certainly hope to see some much more
realistic forecasting from the centre about the
demands that the new buildings will make on the
water infrastructure. I am conscious that we have had
to limit the amount of interaction and some of you
may have wished to come in on some of the questions
and did not have an opportunity. If you do feel that
you missed an opportunity and you would like to
write in with further supplementary answers, do
please do that and cover any other point that you felt
you did not have an opportunity to cover in the short
time we had. Thank you very much to all five of you
for sharing your expertise with us this afternoon.

Examination of Witness

Witness: MR GIDEON AMOS, Director, Town and Country Planning Association, examined.

Q707 Chairman: Welcome Mr Amos. You will have
heard that we have already discussed some planning
issues which we should like to discuss with you
further; perhaps not on the regional basis that we
were discussing earlier, but clearly on a national
basis. Before we start asking you a few questions, is
there anything you would like to say by way of
introduction or would you like us to go straight into
questions?
Mr Amos: I should like to make a very few brief
comments. I am aware that I am about 20 per cent of
the number of witnesses in your previous session but
I hope I do not represent 20 per cent of the expertise.
We are not a specialist water organisation and
therefore our comments really come from an
association which is the longest established planning
organisation in the world and which remains an
enthusiast for providing homes, empowering
communities and sustainable development. Those
are our key charitable objectives. We are not the
professional association, we are the enthusiast body
and therefore our members include local authorities,
other public sector bodies, private companies, a
range of individuals and we are cross sector in that
Mr Gideon Amos

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The provision of an increasing number of homes. We believe that there has been a background of under-provision, in fact falling provision, in south and east England over recent years. We should point to 100,000 homeless families and rising, which is surprising, to say the least, in a country with such high levels of economic growth as ours. That is just one feature of the problem, but I am sure you are well aware of the background to it and I really wanted to set out our stall in that way at the beginning.

Q709 Baroness Sharp of Guildford: How far do you support the twin-track approach to maintaining water supplies in which new sources are identified and exploited at the same time as demand is managed? We also know that where new resources are identified and exploited this may require the construction of new dams and reservoirs. Do you think the planning system presents obstacles to delivering such assets within the timescale? This picks up the issue of timescale which you were talking about.

Mr Amos: On the twin-track approach, to take the infrastructure point first, I noticed one of your witnesses pointed out that even if the water companies have funding in place for new infrastructure they need to get planning permission. In terms of the leak management, water management, the cost-benefit approach that water companies take where prices go up, more funding is available for leakage management and the Water Framework Directive seems to encourage that approach, but our belief is that is not enough. More needs to be done to improve water management. You have discussed a 25 per cent increase in water efficiency which might be possible and some of our views would be similar to those expressed in relation to building control and building regulations.

Q710 Lord Whitty: On the planning side, you said that the Government’s Communities Plan “...falls short on environmental sustainability”. What steps would you like to see the Government and regional planning authorities take to ensure that we do have a more sustainable use of water and how would that change the structure and the interrelationship of the planning levels that we have at the moment?

Mr Amos: Taking the East of England as an example, we should want to see what we are describing as a green-blue vision for the landscape management of the whole region, which would go way beyond the 2020–21 period. So we should be looking at the areas of the region which are water rich in comparative terms than other areas. We should be looking at the landscape value of those areas and planning in that context for the much longer period. New settlements are already proposed in the region. We should be looking at one of those to be an exemplar in terms of...
water management to bring in all the technologies you have been discussing.

Q711 Lord Whitty: When you say “looking at one of those to be an exemplar” do you mean counties?
Mr Amos: One of the new settlements which are being proposed in the current draft; there may be others. In terms of other planning measures—and this anticipates your further question—we believe the Code for Sustainable Homes should be integrated into both planning and building regulations. Some of the provisions are more appropriate to be integrated into planning policies, whether RSS or local development frameworks, others are more appropriate to be integrated into building regulations, but by and large they should be integrated into building regulations and thereby become compulsory. Government ought to set a clear date by which they expect the building regulations to have taken on board the Code for Sustainable “Buildings”, as it once was and as we should prefer it to continue to be; a clear date by which that Code would be integrated into regulations.

Q712 Lord Whitty: You heard our discussion on re-use. Do you have a view on how re-use can be built into the regulations or indeed the Code?
Mr Amos: Indeed; grey-water recycling and so forth. There are some interesting issues about costs of such schemes. The current way in which we use water is not free of cost either. We are looking at the use of renewable energy and some of these technologies are much more cost effective if they are done on a community or neighbourhood basis as opposed to an individual house-by-house basis. The same would apply to grey-water recycling and some of those filtration and purification costs would be reduced. You do not necessarily need to irradiate your water before you put it on your garden, to water your vegetables for example. It is important to encourage grey water recycling and sustainable drainage. Greenscaping and porosity of surfaces is something of a Cinderella in this area, but the degree to which we hardscape our environment has all sorts of knock-on effects in terms of flooding, though that is a separate matter, but also on the aquifers and water table. That is something we should be looking for in our developments: to have porosity and softscaping in their surfaing, which also has knock-on benefits in terms of landscaping and green environments.

Q713 Baroness Sharp of Guildford: How far are you familiar with the BedZED example where, to some extent, attempts to pilot such developments have for the moment become somewhat unstuck and have not actually resulted in people accepting the behavioural changes one would hope out of these things? Buildings”, as it once was and as we should prefer it to continue to be; a clear date by which that Code would be integrated into regulations.

Mr Amos: Indeed. We know it well, Bill Dunster, one of the architects is one of our members and very active. It really goes back to the point that yes, we certainly do need education, but we do believe regulation is vitally important.

Q714 Chairman: What I should like to do, if I might, is ask you to write in to answer our last two questions of which you have already had notice.
Mr Amos: Yes, that is fine.
Chairman: In that case that completes today’s session. Thank you very much. I am sorry we have truncated the proceedings, but timing is not entirely in our gift. Thank you again, Mr Amos, for your help and we look forward to hearing further from you.
TUESDAY 7 MARCH 2006

Present

Broers, L (Chairman)
Howie of Troon, L
Lewis of Newnham, L
Oxburgh, L
Patel, L

Perry of Southwark, B
Sharp of Guildford, B
Taverne, L
Whitty, L

Examination of Witnesses

Witnesses: Dr Will Medd, Research Fellow, Centre for Sustainable Water Management, Lancaster University, Dr Paul Jeffrey, Principal Research Fellow, School of Water Sciences, Cranfield University, Ms Christine Sefton, Research Assistant, Department of Geography and Environmental Science, University of Bradford, Mr Gary Grubb, Associate Director for Research, Training and Development, Economic and Social Research Council (ESRC), and Mr Mike Pocock, Co-ordinator of the Water Resources Network, Water UK, examined.

Q715 Chairman: Welcome everybody. This is the Science and Technology Sub-Committee on water management. I would especially like to welcome our witnesses. Thank you very much for coming to speak with us. Perhaps, as there are five of you, you might like to take into consideration that we will be here an awfully long time if you all answer all of the questions. I do not know how you will subdivide it between yourselves but perhaps you all know each other and can do that. Perhaps you would start by introducing yourselves and telling us where you come from.

Dr Jeffrey: My name is Dr Paul Jeffrey. I work at the School of Water Sciences at Cranfield University which is in deepest Bedfordshire.

Ms Sefton: I am Christine Sefton. I am a researcher at the University of Bradford.

Mr Pocock: I am Mike Pocock. I am the Head of Strategic Planning for the Veolia Water Group, but today I am representing United Kingdom Water Industry Research and Water UK.

Dr Medd: I am Will Medd from Lancaster University and the Centre for Sustainable Water Management and the Department of Sociology.

Mr Grubb: I am Gary Grubb. I am the Associate Director for Research, Training and Development at the Economic and Social Research Council (ESRC).

Q716 Chairman: Thank you very much. Would any of you like to make some opening statement or shall we go straight into our questions?

Dr Jeffrey: Let us go straight into questions.

Q717 Chairman: What level of awareness is there of water and sewage issues amongst the UK public, and what might be done to heighten this awareness?

Dr Jeffrey: I think it is important to distinguish between awareness on the one hand and understanding on the other. I think the UK public's awareness of water management issues tends to reflect significant media stories and their awareness and interest goes up and down yearly and seasonally. In terms of understanding, our research has shown that the level of understanding has improved over the last five or 10 years. People are certainly more understanding of the natural water cycle, they are more understanding of engineered infrastructures and how they work and they certainly want to learn more when there are significant issues at stake.

Ms Sefton: My research has been in having in-depth interviews with the public. As Dr Jeffrey says, there is an awareness of the issues that are highlighted within the media, but when you start a conversation with people you find there is a real interest in water and they understand that water is of real importance. The problem is that that conversation rarely happens. I would say there is a lot of understanding about negative issues concerned with sustainable water management and it tends to be reflecting what the media put out. When you actually discuss water with the public they are very interested in how they can be more informed about it. A typical response would be “I never realised just how important it was before we had this conversation”.

Q718 Chairman: So you think there is not any longer that feeling that everybody is entitled to as much water as they like and that it is an unlimited free resource, do you?

Ms Sefton: I think there is a difference between their awareness of water as a substance and then when it is linked to the environment and environmental issues and water as supplied by the water companies. There is quite a lot of suspicion and distrust of the water industry. The older participants would say that they can remember privatisation and they are still not very happy about privatisation. The two case studies I looked at were in Sheffield and Essex. In Sheffield there were certain negative feelings about the water industry in terms of it being privatised.
Q719 Lord Taverne: You said they are aware of the issues when you probe them, but how far are they aware that they can do quite a lot about it themselves? There are a lot of gadgets available for sale which reduces the use of water. The number of times you flush a lavatory can have a considerable effect on how much water you use. We have had some evidence that they do not take all that enthusiastically to various water saving devices.

Ms Sefton: Most people care about the environment and they consider themselves not to be wasteful. They are not particularly aware of the gadgets and when they are, they will say it is really difficult to change a lifelong habit. So the will might be there but that does not necessarily mean that it gets translated into behaviour. If you have been brought up from the age of two to wash your teeth in one way and then you are asked to do it in a different way, you might have the motivation and the belief that that is what you are going to do, but when you are getting up and stumbling through your bathroom habits in the morning it is not necessarily what you actually do. It is not because they do not want to but because changing habits is hard. They would like help and support in trying to be more environmentally responsive. People look at their lifestyles as being quite busy and you do what you do because that is the way machinery is built and that is the way bathrooms are built and that is the way people live. I would say it is asking quite a lot for people to make some of the changes that are being asked of them individually.

Dr Medd: There are many different publics out there and so we need to start asking questions about which people, in which circumstances and in which contexts are willing to engage in particular debates about changing their practices. We also need to think about where demand is constituted. We can think about how people make decisions to consume water in particular ways, but when we look at how people consume water, it is often because they are doing things like gardening, they are showering, they are in the kitchen or they are washing clothes. Water gets consumed through other services and other practices rather than necessarily being a conscious thing.

Q720 Baroness Perry of Southwark: In the light of what Christine Sefton said, do you think it would be a waste of time to have some organisation like the Carbon Trust and the Energy Saving Trust that we have for energy to promote the careful use of water?

Ms Sefton: I think it would be useful for water companies not to be the sole promoters of water efficiency information because people find that quite confusing. Why would someone selling you something ask you to use less of it? They are deeply suspicious of that. It is not that they have not done some sterling work but it is a confusing message. The work I have done in Sheffield, for instance, is based on a sustainable urban drainage system that has been put in—which is taking it away from consuming it in your house and it relies on public compliant behaviour in terms of three ponds that are going to be part of a district pond—in order to stop them dumping stuff. What the public and the young lads who were considered to be the likely worst offenders—and they agreed with that assessment—said was that a fishing lake built in to the district pond that would be serviced by the subsystem would make it something that was relevant to them and something that was positive. Sustainable water management needs to be made more celebratory. There needs to be more positive awareness. You should not just be hearing what you should not be using or should not be doing and what you can do to stop this imminent crisis, which is a really negative way of having a conversation with somebody, but rather you should have a much more positive dialogue with people. The water festivals in Hampshire are a good example of how that can be achieved and information disseminated simultaneously.

Q721 Baroness Perry of Southwark: I wanted to ask about the stakeholders and policymakers and others. To what extent do you think that the social and behavioural side of water management is given due regard by the stakeholders and those who make policy?

Mr Pocock: I think the social and behavioural issues have become quite important in the emerging issues for the water industry. I think we have come up, after a long history, with an engineering and scientific approach to water supply.

Chairman: We will have to adjourn.

The Committee suspended from 3.56 pm to 4.03 pm for a division in the House

Q722 Chairman: Mr Pocock, we cut you off in full flow. I do not know whether you want to resume or whether Lady Perry will ask the question again.

Mr Pocock: I am quite happy to resume. The social and behavioural side of water management has become an emerging issue in the water industry in recent years. The industry has had a long history of an engineering and scientific approach to predict and provide, but the scarcity issues and the challenges we are facing in the South East have meant we have had to look more carefully at how we can deliver demand management more successfully. Certainly research in the water industry in the last few years has tried to look at the reliability of how we do demand management and improve that and rather than just technological fixes we are looking at how we can influence those behavioural changes. What we have
found is that doing social research is much harder and this has reinforced our views that small scale research projects have not been helpful in providing the reliability that we are looking for when you have to make investment decisions eventually on the back of implementation decisions on demand management. We do believe it is important that we vocalise more research and larger scale research so we can improve the reliability of what we regard as a very important emerging area.

Q723 Baroness Perry of Southwark: Is there a problem with getting enough funding for this either private or public large scale research or deeper research in this area?

Dr Medd: In terms of these sorts of questions, we are at the very early stages of trying to formulate them. In terms of water in particular, it has been very dominated by the industry around how engineering models see social behaviour. At Lancaster we have been working with UKWIR, the UK Water Industry Research, in trying to develop a sociological basis and a sociological community that can start to ask questions about human behaviour. With that, for example, we are putting in funding for an ESRC centre to look at the broader issues of environment, society and sustainability of which water is one stream. So there are funding opportunities within certain contexts. What we are trying to do is build up a capacity for more strategic longer-term visions and we are in the early stages of that.

Q724 Lord Lewis of Newnham: I would like to take up a point that was implicit in Dr Medd’s statement about the water companies themselves being the advisers and the degree of suspicion that goes with that, and I completely accept what you are saying. Which body within the regulatory structure is responsible for promoting water efficiency amongst the public? There has got to be some source for this. Are these lines of responsibility drawn clearly enough and what kind of impact do you expect from the Government’s Water Saving Group?

Mr Pocock: Clearly the water companies do have a duty to promote water efficiency with their customers, that is part of their duties under the Water Industry Act and we do take that duty very seriously. Ofwat has a duty to make sure we satisfy that duty. I think it is reasonably clear for the professional contributors to the issue. Equally, there are other people who think water efficiency should be done regardless of costs and I think that is a difficult area. Overall the big issue for us is that we do need to develop other people. One of the key issues in that strategy is to develop partnerships. Although we have a statutory duty, we do not believe we can deliver it on our own. We do engage with other parties. For example, we see the Environment Agency as a key partner. The new duties to conserve under the Water Act 2003 we see as very helpful because it has extended the duty of conservation to public authorities. We do see big opportunities arising from working with other people. For the reasons that Christine mentioned earlier, we do see the independence of other organisations as very helpful. We think the Water Saving Group itself is valuable in the sense of creating one voice. One of the things we have been looking at is whether the public, perhaps with the different parties involved, get a consistent message from the Agency, from Ofwat and from the water companies. I think it was important that we moved to a situation where we were starting to reinforce messages to the public as consumers rather than creating parallel paths or diverging paths. I think that is where the Water Saving Group can really have a role in making sure all the activities are focussed and where the public can see a reinforced message on water efficiency. We believe that would be a great help to us in delivering our statutory duty.

Dr Medd: I have been involved in a European research project that has been looking at intermediary organisations in the water sector. One of the findings of that has been that water is consumed in very different contexts and that one of the challenges is how you translate issues of sustainability into different agendas, for example business efficiency or good housekeeping. When we are thinking about what organisation ought to take responsibility we need to think about how any organisation is going to translate through the process of implementation into different contexts. It may well be that water saving is not the best message, that good housekeeping or economic messages are about the water companies themselves being the stronger and that very different types of bodies may be appropriate to the local contexts.

Ms Sefton: The duty that water companies have had to promote water efficiency has meant they have had to do an annual assessment or evaluation of how successful their awareness raising campaigns have been in terms of behaviour change which is just being seen in terms of how much water has been saved. Behaviour takes a lot longer to change than a year. I think what has happened in that sense is the awareness raising campaigns have not been seen as effective and they do not work because the public are essentially self-centred and do not listen or do not want to change. This is because their interest in sustainable water management has only really been evaluated on whether they have saved water in their domestic water usage or not, which is not really fair on the water companies and it is not fair on the public assessment of their behaviour.

Q725 Baroness Sharp of Guildford: Who is it who constitutes the Water Saving Group? Is it the water companies who largely form this?
Mr Pocock: There are five important members: Defra, who set the group up and co-ordinate most of the activities, Ofwat, the Environment Agency, the Consumer Council for Water and the water companies. Other people are invited to join the five strands of activity and clearly that involves a whole variety of researchers and other bodies, but those are the core members.

Q726 Baroness Sharp of Guildford: In some ways it is so large it is almost a rather nebulous group.

Mr Pocock: Yes. It has been very helpful in terms of creating a dialogue which is developing consistency.

Q727 Lord Lewis of Newnham: But they do speak in unison.

Mr Pocock: That is starting to happen, which I think is the value of that group. Obviously it is still developing its thinking as to how each of the strands is going to be delivered. For example, the Consumer Council for Water is the one that has been asked to take forward the issues of customer attitudes and behaviour and, not surprisingly, the customer being their main focus. They will be working with other members of the Water Saving Group to look at work that is being done and to encourage the best practice and to see how that work can move forward. So it is helpful in creating that dialogue and consistency.

Q728 Lord Taverne: What are the most important lessons we can learn from other countries in terms of water demand management?

Dr Jeffrey: I think there are a number of good practices that we can learn from other countries. I would rather not call them best practices for reasons I will perhaps say a little bit about later. I think we can look to the United States for lessons on water recycling, on pricing and on demand management. I think we can look to Australia, where I understand your Lordships were very recently, also for lessons on issues of water recycling and demand management. I think we can look closer to home, to other countries in Europe, such as Cyprus and Spain in particular, as to how they have addressed short-term and long-term water shortages. I have been particularly impressed with the Spanish Government’s approach to this which is multi-faceted, it is integrated, it is collaborative and it is consultative. They have done a fine job over the last decade or so. The reason I say that this is good practice rather than best practice is that experience shows that it is really difficult to pluck out experiences from other countries and dump them in another country because so much of demonstrated benefit, utility acceptability, is to do with local circumstances and local cultures and how the economics stack up in any one particular region. As long as we take these examples with a pinch of salt and make sure they are well adapted for use in the UK I think there is an awful lot we can learn.

Q729 Lord Taverne: In the field we have just been discussing, getting the public to be more ready to accept changes of practice and getting away from their traditional practices, is there anything special that the Spaniards or the others have got to show us on this?

Dr Jeffrey: I think it is time. I really do not think you can expect people to accept significant changes in the way water is managed, how it is delivered and how it is conceptualised as a product over a very short time period. You clearly need to develop and win a number of arguments about legitimacy, ie who is legitimised to make these changes, what is the credibility of those changes and who is to be trusted to implement those changes. If you look at the history of water management in places like Florida, for example, and even Australia, they have 15 to 20 years of legislative background and public awareness raising to draw on. At the moment we seem to be quite a way behind those sorts of timescales.

Ms Sefton: They do not have such a wet country. The perception in this country is it rains all the time and in most of the countries that Dr Jeffrey has mentioned it does not. Even in Essex, where they have an average rainfall similar to Israel, the people that I interviewed said, “It rains all the time. It’s a wet country. We have to use umbrellas”.

Q730 Lord Oxburgh: Mr Pocock, you spoke of giving messages to the water consuming public, but giving messages to anyone is not a great deal of value unless you understand the thought processes of the people to whom you are sending those messages. What are the water companies doing to improve their understanding of how people actually use water and to influence their behaviour?

Mr Pocock: The industry has done a lot of work in the last 15 years looking at consumption. There is a well-developed branch of our work which is in an area called micro-component analysis, where many companies have tried to work with their customers through using a combination of questionnaires, diaries and also logging their suppliers to develop models of ownership and volumes of frequency and these have formed the basis of our demand forecasting work and breaking down the consumption use to the point of use, ie how many times they flush a toilet a day, how many times they use a washing machine, how large a washing machine they have. That work has been well established now for 10 to 15 years. What that has shown us is that we do understand the components quite well, it has shown us that the consumption is very variable, but
perhaps where we are now starting to realise our work needs to go is to understand why the customer is using that water as it is and the rationale behind, for example, if someone is using the toilet, whether they are using it just for the main purpose of its use or to flush away tissues they have blown their nose with and whether they are washing clothes for the purpose of keeping their clothes fresh rather than needing to get them cleaner. Companies have started to realise that we need to understand that customer base somewhat better. That does mean continuing the work we are doing on developing it. At the end of the day we hope that work will lead us to improve the message we give to customers because we do not believe asking customers to save water so please do not use your washing machine this week is the right answer. What we need to be doing is helping them to understand why they are using water and to help them with their options for changing their patterns. I think it is a much more collaborative and partnership-type approach we are looking for in the future.

Q731 **Lord Oxburgh:** It seems to me that demand management in general and metering in particular seems to introduce really rather a paradox as far as the companies are concerned because if you do not have metering it is clearly in the company’s best interests to promote demand management and for people to use as little water as possible. As soon as you introduce metering you are actually looking at the income stream to companies and companies are given the responsibility, as someone pointed out earlier, of saying use less of what I am trying to sell you. So it does seem to me that that particular aspect of demand management introduces something of a paradox. Would you care to comment on this?

**Mr Pocock:** I think that is largely true. Water companies do recognise that at the end of the day we do have to manage the availability of resource. One of our primary purposes is to maintain the availability of water for the customers and we have two ways of doing it: we either have sufficient water or we control demand. What is important is we have a balanced response to both those measures. Where we are in a situation in certain geographical locations where the water stress is greatest or in the future it is seeing less then inevitably the economics will shift towards using demand management techniques to find a longer-term solution to managing the supply-demand balance. That is why companies have recognised the importance of metering, because it is at least creating that environment which provides, hopefully, a satisfactory service to customers and the vast majority of customers are very satisfied with the service they receive. Going forward, that needs to continue and we need to be able to provide that balance. If we have not got enough water, we need to make sure that that sufficiency is maintained while working with the customers.

**Dr Jeffrey:** I think metering has problems, particularly the introduction of metering into properties where traditionally they have been charged on a rateable value or whatever. There are three important benefits of metering. First of all, it provides a direct link between water consumption and individual households. People can see the wheel going round and they can take action and see the wheel going round slower and the bill changing at the end of the month. It is a direct personal link to resource consumption.

Q732 **Lord Oxburgh:** What you say would be true if indeed these things were monitored and checkable by an individual household on a monthly basis but, in fact, water meters as currently installed are generally remote and not readable by householders in any convenient way.

**Dr Jeffrey:** A lot of the meters that I have seen are readable by customers. I am not questioning what you say. I think they can be made readable by customers. There are problems with installing them. If they can be read, they do provide this direct link. Secondly, they open up a new area of demand management based on pricing and on time of use tariffs. Thirdly, they are an important research tool because if we are to understand the link between attitudes, perceptions and water use behaviour we need to be able to link that at least to the household level. We would like to be able to meter every pipe in the house but that is not going to happen. If we can bring it down to household level then that helps research as well.

**Ms Sefton:** One of the dangers I see not in meters per se but in the way that they are being promoted is that we will make people save water because they will be able to save money on their bills. It is the fact that they will be saving money and not that they will be saving water that will be the important thing that is pushed. If you have enough money you can use whatever water you want, it will not matter. What is almost implicit in what you are saying is that water is not really the important issue here, economics is. You are not really promoting the message that we need to be caring about the environment and about this resource which is quite precious and requires a lot of looking after. Metering could be used as a way of promoting efficacy, as Dr Jeffrey was saying, in terms of enabling people to know when they are using more water, what their own behaviour is, so it can be used as a feedback education system. There is merit in having community meters where you have information about where the water is coming from, what the reservoir levels are and what the available
water for that community is and whether that community is saving water as a whole. One of the problems with asking people to save water is that they will feel that it possibly is an awful lot of effort for them to be doing in their little individual house, but if next door are not doing the same or if the rest of the community is not doing the same then what is the point? The really big problem with that is if I am saving water in my little house and there is all this leakage coming out of the water company that is apparently due to mismanagement then what is the point? I can save all I like but I am not going to save anywhere near what is needed. The perception is there are leaks so why are you penalising me?

Q733 Lord Howie of Troon: Is it not likely that if water companies have reduced incomes they will merely compensate that by raising the price and we will be back to where we started?
Mr Pocock: I am not sure I could answer that question fully. At the end of the day there is a difference between a short-term and a long-term issue.

Q734 Lord Howie of Troon: The prices are not capped or anything, are they?
Mr Pocock: The prices?

Q735 Lord Howie of Troon: Yes.
Mr Pocock: They are in the sense that there is an approved process for agreeing the price regime for a five-year period. Obviously there is a regulatory mechanism which agrees the price to customers. The important thing at the end of the day is that there should be a balance between the different measures. Obviously there are costs associated with metering that are important. If by reducing the total demand that is supplied by a company over time the way the service is provided and the efficiency of that service will be taken account of as the regulatory process follows its normal cycle—

Q736 Lord Howie of Troon: I am quite sure that you have to increase the price. How is the recent decision in Folkestone and Dover likely to affect demand?
Mr Pocock: The industry has done quite a bit of research on the impact of metering over the years. Your Lordships might remember the national metering trials carried out in the early Nineties. That huge amount of research which was carried out by a number of water companies still provided a basis from which one could understand how customers use water and has been helpful. The expectation is that the metering of Folkestone and Dover will save about 12.5 per cent of demand in that particular case. Obviously it is important that that saving is achieved and maintained and those effects are assessed, measured and monitored over time. Picking up the point that Christine is making, it is also important that that metering process also engages with the customer in terms of informing them about opportunities for water efficiency and potential savings that they can make themselves.

Q737 Chairman: As I understand it the figures for Folkestone and Dover suggested 70 per cent of households will pay the same or less, which certainly implies a significant reduction in revenue for the companies, does it not?
Mr Pocock: Certainly the 70 per cent I recall as a figure. I cannot really comment on the reduction in revenue.

Q738 Lord Howie of Troon: I have been interested in water metering since I was the MP for Luton about 40 years ago and that was when Kents used to make them and for that reason I thought they were a good idea. I still think they are a good idea but I am extremely sceptical. In both houses which I inhabit I have got meters and, I must confess, they make not the slightest difference to my consumption of water. I wash my face when it is dirty, which is quite frequently, and so on and my family is exactly the same. In my main house my reason for having a meter is not because it saves water but because it saves money for me. Water was quite expensive in my large house when there were six of us in it but it is still expensive with one of us in it and that is me. I get what I am paying for and that is fine. I am unconvinced that it makes people decide to use water more sparingly or to use it more efficiently. To what extent have your surveys been sufficiently personal to determine the effect of metering on the usage of water? I speak as a happy sceptic!
Mr Pocock: Globally we do have and certainly there was as sample in Ofwat’s Annual Report on components of demand, which supports the view that the average customer paying by meter charges does use less than those on unmeasured charges, so I think there is quite extensive evidence. You are quite right, however, that we need to understand more within the components of use how those decisions are taking place. I think there is an awareness, for example, in peak for garden use and a customer who is on a meter is more conscious of the use of that water. There are a few of those customers, I am sure, who will take the view, “I have invested in my garden and I will use more water.” Conversely, there are a lot of customers, equally, who would have regard to the additional costs for the meter, not necessarily by reading individual meter readings but by the knowledge that they will be paying by volume.
Lord Howie of Troon: Yes but I would never dream of reading the electric or gas meter. It seems to me highly preposterous and then like so many people I pay these meter bills by direct debit, therefore I do not really know what I am paying. They tell me every now and again and I say, “Oh dear.”

Chairman: Lord Howie, I am turning to Lord Lewis.

Lord Lewis of Newnham: These are interesting observations, Chairman.

Q739 Lord Lewis of Newnham: I can understand how you can tell the amount of water that has been used in a metered house but how do you tell the amount of water that has been used in an unmetered house, when in point of fact really the pricing is associated, if I understand it correctly, with what I would call the rateable value of the house? So how do you make that assessment?

Mr Pocock: That is quite hard and in a number of companies it is carried out by establishing a small sample of often between 1,000 and 2,000 properties from the unmeasured customers and that size of sample gives the model of the consumption of that sector. Obviously any modelling approach brings with it inaccuracies.

Q740 Lord Lewis of Newnham: What is the statistical error that you are talking about in these sorts of things?

Mr Pocock: About 10 per cent.

Q741 Lord Lewis of Newnham: Which is the sort of order we are talking about in savings. This is one litre in twenty, a 5 per cent saving. Sorry, I am just a little bit suspicious of the evidence that has been used here.

Ms Sefton: Can I add something about the metering. It is only going to be coupled with the cost of the metered property if people want to know how much water they are using. You are only going to be educating the bill payer. Anybody who has ever had teenage children will know that they have absolutely no regard whatsoever for how much is being used. Thus education has to go past that. If metering is the tap to brush your teeth; but we got one from a teenage child, and he will know that he has absolutely no way to get rid of it. So I say, “Oh dear.”

Chairman: Lord Lewis, I am turning to Lord Lewis.

Q742 Lord Whitty: Can we look at the question of fitting water-saving devices in homes, or other buildings for that matter. We have been told that developers are very reluctant to fit them even though they are available and the technology is there. What are the obstacles? What would make it more likely that they would adopt them? Can we somehow make water efficiency a selling point for a home as we are trying to do for energy efficiency?

Dr Medd: I will have a go at kicking off on that. If we think about where water is situated within the home and let go of water, one argument is that we could say we are focusing too much on water and not on what people do in the home to consume water. Instead of thinking about people making decisions in terms of demand, we should start thinking about homes and home life. Then we start to look at kitchens and bathrooms and start to look at the industries behind those in terms of constituting where that demand is. If we wanted to shape, for example, water-efficient devices in kitchens, we should probably be looking at kitchen designers and the advertising regimes that are behind those, and we need those type of partners, not the Water Savings Group, not the water companies, not the regulators, so part of that is about trying to think through where that demand is constituted in the first place. Again, I do not think developers are the answers. In a way it is about the cultural and symbolic value of some of those devices. In that sense, let go of water and think of the wider context.

Q743 Lord Whitty: Are you talking about developers who would be thinking about taps and showers and those types of devices in the first instance, on which there can be quite a significant improvement in efficiency (although you have to watch for the danger of people taking them out because they do not like the design)? Are you saying that we should focus more on dishwashers and washing machines than on the size of baths?

Mr Pocock: Not really reducing it down to that level but more thinking of who promotes shower rooms. If you think of bathroom manufacturers, we got a Christmas card this year from the water companies saying “Save Water: this is how you should turn off the tap to brush your teeth”; but we got one from bathroom manufacturers saying “Enjoy water, enjoy showering: this is what a nice healthy shower looks like”. It is the perception there. If you take that approach then the place where you look to influence change changes quite dramatically.

Ms Sefton: If you watch any of the programmes in the evening on property development or house buying advice or Grand Designs, it is ensuite bathrooms for all the bedrooms and the bigger and more grand the bathroom the better. The massive message there is that abundant water is being promoted on a public
basis, certainly not water efficiency. The other negative message you get is your plumber, when you eventually do get one to come round to your house, will tell you “not to put them silly devices in the cistern because it messes it up anyway”. Because they do not have much of an understanding or awareness or even an impetus behind water efficiency, you are getting a converse or opposite message.

**Q744 Lord Whitty:** I am really asking you how do you we change all that? We started with the regulation on builders. There must be other ways of changing that behaviour.

**Mr Pocock:** There are several options. Some work is being done, for example, on the encouraging market transformation effect, which is about creating a dialogue and awareness within the suppliers to think again about their products and through pursuing better design and improved styling not to reduce comfort levels but to reduce the amount of water used. I think it is important that the customers do not see a water-efficient device as one that provides a lower level of comfort and serviceability. There are other initiatives that have been very welcome. Obviously there has been quite a lot of debate about the degree of regulation that could be helpful in encouraging improved efficiency. We welcome the Sustainable Buildings Code, for example, and think that would be very helpful. It is expected that will create a new standard for house builders to work to. I think there is a question of degree. The intention is for it to be discretionary but there will perhaps be an opportunity to make it more mandatory. However, it will require a better level playing field for developers which will be helpful and should increase the ability for the suppliers to pursue better design.

**Dr Jeffrey:** Just as a final point, in-house water recycling is rather inefficient at single house level and it has been poorly taken up in the UK, but in Germany they have had quite a lot of success. If you look at the difference between how the units look in the UK and in Germany, in the UK they are just a series of tanks, pipes and devices; in Germany they have created what looks like a fridge. It is gleaming, it is white, it has got ‘Smeg’ written on the front of it, and it looks desirable. Backing up what Will said about targeting the people who are designing materials and designing appliances, that is certainly true in the German case with in-house water recycling systems.

**Q745 Lord Patel:** I think my question is pretty simple but if the answer is too long you can always write it, which is related to how do you address the resistance the public has about water reuse? Do not take a deep breath!

**Dr Jeffrey:** Worryingly he took a deep breath! I think the public reaction to water reuse has two elements. First of all, there is this yuk factor which is simply a very basic human response to anything that is considered infected or dirty.

**Q746 Lord Patel:** That is the effluent treated water.

**Dr Jeffrey:** That is to treated water, to the return of treated water.

**Q747 Lord Patel:** What about roof water, storm water, and local recycling?

**Dr Jeffrey:** Yes, I think we are victims of the success of our own engineers in many ways. We are used to coming down and turning the tap on and getting a very high quality reliable source of water when we want it almost where we want it, and anything that deviates from that assumed quality and reliability is considered substandard. You have got to applaud the water companies for getting us into that situation in the first place. I feel that any sub-potable quality water is viewed with suspicion by the public.

**Q748 Lord Patel:** You are rehearsing to me the resistance that the public has, so how do you address it?

**Dr Jeffrey:** I think one has to first of all build on awareness and understanding—awareness of existing water cycles, awareness of water quality standards—and also promote trust in those bodies that are assigned to set sub potable water quality standards and police water recycling systems. Again, drawing on the experience from the United States and Australia, successful systems appear to be those that have this legitimacy and trust well established. Something else that I think I would point out is the one thing that is holding back water recycling in the UK is the lack of any legally enforceable sub potable water quality standards. We have several sets of guidelines but we do not have anything that you could point to in court and say we have treated water to that level.

**Q749 Lord Lewis of Newnham:** Only in as much as surely, water that comes out from a water company has got to have its legal requirements with the constitution of chemicals and things like this. One of the big problems certainly in the old lead situation was that very often the lead was getting into the water.
7 March 2006 Dr Will Medd, Dr Paul Jeffrey, Ms Christine Sefton, Mr Gary Grubb and Mr Mike Pocock

not when it had left the actual water station but it was in the actual connections and things of this nature. Dr Jeffrey: But the DWI standards are for potable quality water—

Q750 Lord Lewis of Newnham: Oh, I am sorry—

Dr Jeffrey: And if recycled water is to be used for sub potable water—

Lord Patel: A general legal framework is required.

Q751 Lord Lewis of Newnham: Can I just take your point which you made earlier which I think is a very fair point when you said people look upon this as dirty. Let us take a totally different area which is recycling of waste and commodities like that. 20 years ago people would not touch waste from the point of view of recycling and although I am not saying it is a major success story it is, relatively speaking, successful now, and if you look at the actual quantity of waste that is being recycled, it is very significant. Are we really saying that part of the problem is that there has not been enough attention given to the whole situation and it has not been addressed in the correct sort of way and that, realistically speaking, we have got to sell it as we sold the recycling of waste?

Ms Sefton: I think it is important what they are saying about there being a regulatory framework for that to happen and for people to feel confident about it. You are talking about changing society norms, which usually does not happen overnight. There needs to be support for the change to happen in a wide enough way so that it is not seen as a weird activity to get into, that it is actually seen as a socially normal thing to do and then it ceases to be that dirty. That only happens when you feel you are a small group doing it. There needs to be a shift, but that can be supported and there have to be enough people doing it all at once for people to feel comfortable basically.

Dr Medd: I think an important point to underline in all of this is we need to do a lot more research on these issues in terms of establishing what different responses there are to different sorts of water, and that includes asking questions about the regulatory structure. If there is effective demand side management through these routes, that creates an awful lot of uncertainty for supply management and the current investment in infrastructure by the companies, so I do not think we can separate out the question of the public’s attitude from the institutional framing of the water companies’ backing and investment and the research councils’ funding behind that.

Mr Pocock: There is an issue of ownership, too, of who is responsible for the on-going maintenance of these systems. At the moment there is uncertainty over, for example, the sustainable drainage systems and who is responsible for the management and upkeep when we put in in-house systems, so for example, there are issues about who will provide service and maintain a dual infrastructure system. There are regulatory issues that we do need to look at to try and clarify that because part of that trust that we are trying to encourage in customers is the acceptance that standards are being managed by utility or service providers for those customers, so there is a whole support mechanism. Customers need not just the confidence in the technology but also confidence in the maintenance and operation of those systems over time.

Q752 Chairman: We have two questions for ESRC and if I may turn to Mr Grubb now. The first one is to what extent is it within the ESRC’s remit to fund research on the economic and social dimensions of environmental issues like water management? Do you believe that it is important for research into long-term sustainability to include elements of economics and social science?

Mr Grubb: The short answer to that is yes to both.

Q753 Chairman: Can you be more specific then? How many water-related programmes have you funded in recent years and what proportion of your expenditure has gone on such research?

Mr Grubb: We have funded a number of programmes over the years, going back to the 1990s where we had the Global Environmental Change Programme, for example, which had elements on water. One of the difficulties in attributing precise sums to this is that water research is often embedded in much larger investments, so for example we have the Centre on Competition Policy which is doing some work on the regulation of water but it is also doing some work on the regulation of lots of other industries. We have funded, for example, the Centre for Social and Economic Research on the Global Environment (CSERGE) at the University of East Anglia, which is now coming up to 15 years of funding, and there is a lot of work on evaluation of costs and benefits in environmental terms, for example in the water area, work on the Water Framework Directive and the Water Bathing Directive and so on. So we have funded a lot of research. At the moment one of our major investments would be the cross-council Rural Economy Land Use programme which is co-funded with the BBSRC, NERC, Defra and SEERAD. That has about £2 million worth of research on water-related issues at the moment and we are in the process of commissioning a third phase. Finally, as has been mentioned earlier, last year recognising the importance of the environment and sustainability issues, we included a highlight notice in our annual research centres competition which encouraged applications in the environment and sustainability
field. We are currently in the process of looking at applications which are in quite a late stage of being considered. We have two applications out of the four which are short-listed which are in the environment and sustainability field, both of which have elements looking at water, one at water in a developing world context and one at water in a UK context. Unfortunately I cannot tell you what the outcomes will be because that is going to our Council in April for a final funding allocation against all the other priorities we have, but I am hopeful that something significant will come of that.

Dr Jeffrey: Could I just add something. I think it is important to recognise that the other research councils because of their larger overall budget do fund quite a bit of research on social and behavioural issues in the water field, particularly the BBSRC and the EPSRC. They see this priority as more of their remit. It is not as if the ESRC is the only funding body for this sort of work.

Q754 Lord Lewis of Newnham: In fact, of course, we have been given a copy of the EPSRC’s current research grants, but one of the questions I would like to ask is how you engage in discussions with the other research councils and an added factor, if I may, is that much of legislation in environment—and we are talking strongly about environmental issues here—emanates from Europe, something like 80-odd per cent of our environmental regulations, and certainly when we come to water a tremendous amount is associated with Directives that come from Europe. Is there any affiliation or association with research going on in Europe because it does strike me that some of these things can happen by reacting to a situation but being proactive could equally well be very important from the point of view of helping us in our form of legislation and interaction with our European colleagues when it comes to the Directives themselves.

Mr Grubb: Certainly taking the first part on our conversations with other research councils, there are a number of forums to do that. We have the Environmental Research Funders Forum, for example, where all of the funders—the research councils which fund environmental research along with other public funders like Defra and SEERAD and so on—meet regularly to talk about research priorities and how we fund research. I have mentioned RELU which is a cross-council funded scheme by BBSRC and NERC, and we have a number of others. We have a joint studentship scheme with the NERC and also with EPSRC. We are collaborating in a new programme on environment and human health. We have the Tyndall Centre for Climate Change Research with the NERC and EPSRC. We have been talking to NERC about their Quantifying the Earth System programme which is looking at mapping water at the moment to incorporate a socio-economic dimension to that. We are talking to EPSRC about extreme weather events. So there is a whole range of joint activities on which we are collaborating. I meet my colleagues in the corridor and many other places very regularly from the other research councils. On the European side obviously a lot of that support comes through the European Framework Programmes. We do provide funding for UK researchers to help them to take part in European Framework Programme activities and a number of our centres including CSERGE have been very active in co-ordinating and taking part in European activities and also initiating pan-European collaborative research. That is a major activity. It is something which we are going to be building on through our new Strategic Plan. One of the things we have been doing is developing a lot of bilateral agreements with other research councils in other countries, not just in Europe but across the world, to speed up and make it much easier for researchers to apply for collaborative research in two or more countries. That is something we are very much looking forward to putting more emphasis on. We launched this new scheme last year and we are building up the number of other countries with which we are collaborating through that scheme.

Q755 Lord Lewis of Newnham: At the moment presumably that is on the legal side and you have not got any actual programmes off the ground. If so, how many of these are water directed?

Mr Grubb: We have not got any through the new scheme. That was only launched late last year so we have not got the first applications coming through that. I know there are some European Framework awards which have UK participation but I could not tell you exactly how many Framework awards there are of that nature.

Q756 Lord Lewis of Newnham: My recollection of many years ago when I was involved with the research councils was that the actual sponsorship of certain areas was very highly competitive. In fact, I would argue that the ‘judgment of Solomon’ was required in many instances as to whether you went for this area or for that area. How does water stand relative to all these other variants that are coming on? Do you think that it has been adequately funded or do you think that it has been inadequately funded. If I look at the academics I am sure they are going to say it is inadequately funded but what is your general conclusion on that?

Mr Grubb: I would say that energy environment and climate change is one of the seven key research challenges identified within the ESRC’s strategic
framework, so it is certainly an area where we believe there is a need for further research and where we will be developing proposals for further activities, and as a part of that we see water and waste and other issues as very important. So we are certainly working very hard with other funders—Defra and so on—to take forward a number of activities in that area so I think we recognise that there is a need for further research in this area.

Q757 Baroness Sharp of Guildford: I would like to come in on the European Framework Programmes. You have mentioned that there are already a number of collaborative projects financed under the current Framework Programme, round six. Presumably energy environment and climate change is a big issue for the seventh Framework Programme as well. Is it going to be receiving more money in the seventh Framework Programme than in the current one, do you know?

Mr Grubb: I am afraid I do not know the exact figures for that. I am sure we can find that out for you if that would be helpful but I certainly agree that I think it would be an important area of the European Framework Programme.

Q758 Baroness Sharp of Guildford: Do any of the others of you know what the current proposals are floating around in the seventh Framework Programme?

Dr Jeffrey: I am not aware that the budget split has actually been agreed yet.

Q759 Baroness Sharp of Guildford: It has not but there have been initial proposals I think.

Dr Jeffrey: That is true.

Chairman: Perhaps if you had any more information on that you might write to us. I think we have to close it off now. Thank you very much indeed for your inputs; we value them highly. If there are additional points that you would like to make, we are open to written contributions which will be included in the evidence and we will take them into account in writing our report. So may I thank you all very much for coming and giving evidence.

Examination of Witnesses

Witnesses: Mr John Slaughter, Director of External Affairs, and Mr David Mitchell, Technical Director, Home Builders Federation, examined.

Q760 Chairman: Mr Slaughter and Mr Mitchell, thank you very much for being here. You have been sitting there so you have heard how we proceed. Would you please introduce yourselves briefly and, if you wish, make an opening statement, or we will go straight into the questions.

Mr Slaughter: Perhaps I would like to make a statement but we will introduce ourselves first. I am John Slaughter, the Director of External Affairs for the Home Builders Federation.

Mr Mitchell: Good afternoon, I am Dave Mitchell, the Technical Director at the Home Builders Federation.

Q761 Chairman: You would like to make a statement?

Mr Slaughter: I was not planning to do this but in response to hearing the preceding evidence I was very struck by the range of issues which has been raised there. We already thought this was quite a big issue but that suggests that it is a bigger issue than perhaps we had appreciated. A point I would like to stress which I think will underline the answers we will try and give later on is that we see a need for what I would call a 'big picture' approach on this. There are a lot of different issues involved in terms of achieving the framework of policy and regulatory measures that will actually work to achieve the objectives that I think everyone wants to see. Our industry certainly has a part to play in that but I have been struck by the various strands that have come up this afternoon. It is our view in any case that we need to have a framework that works consistently across the board with those. That is all I wanted to say.

Q762 Chairman: That is a good overall point to make but let me start with a more specific question to your industry, and that is: what is the building industry doing to ensure that water efficiency is maximised in new property developments, particularly in water-stressed areas in the south-east of England?

Mr Mitchell: Certainly the vast majority of the new homes are now fitting dual flush/low flush WCs with six litre and four and a half litre flushes. Aerators are being put into taps, not all the time but on some developments. As you are well aware, all new homes have to have water meters which we think is quite significant. Rainwater harvest systems are used to a small degree but are perhaps not as popular as they could be, and there are SUDS schemes. Developers like to use SUDS schemes. We have particular issues with SUDS schemes in getting them adopted but if we could get round those you would find that we would use more SUDS schemes. I cannot really distinguish between areas because that is a national picture.
Q763 Chairman: May I ask a specific question about meters. Where is the meter located usually?  
Mr Mitchell: It is normally at the front of the building. It is normally in the footpath or just on the side in a flower bed towards the front. I know what you are alluding to. It is very difficult to read and I picked up on your comments with the last people here. There is in fact an additional device that you can get to fit inside the house which would give the customers a reading of exactly how much water they were or were not using. We have an initiative with the CPA on Innovate for Homes and it is certainly one of the products that we are going to try and bring forward to put to that house developer panel.

Q764 Lord Oxburgh: At what cost roughly?  
Mr Mitchell: We think it is possibly about £80 to £90, something like that, but there is a fitting cost as well because it needs to be wired in because it has got a digital read-out as well. It has other advantages other than what I have just said to you. It also detects moving water and if water has been moving through it for more than five minutes it will shut off. That is what we see as innovative.

Q765 Baroness Sharp of Guildford: So you cannot have a bath that takes more than five minutes?  
Mr Mitchell: But it would save you water! No, there is an override button on it. However, you can go on holiday.

Q766 Lord Oxburgh: You have to get out of the bath and turn it off?  
Mr Mitchell: When you are on holiday you can rest assured your house will not get flooded.

Q767 Chairman: What are the preferences of home buyers today? Are they interested in this? Do they want water conservation?  
Mr Slaughter: My colleague may be able to answer this because I should explain that he until fairly recently was working for a house builder rather than the Federation whereas I have not personally, but certainly if you look not just at water management/water efficiency but other aspects of environmental performance, the general evidence at this stage is that the average home buyer is not particularly interested in these features. To go back to some of the points that have been made in the previous evidence, I think there may be awareness of the issues but there is not necessarily an outcome to those in terms of the qualities that people really want to emphasise in the home. At the moment people are looking primarily at the affordability of the housing because of the housing supply problem that we have. They are looking at location and other qualities, like the number of rooms and so on, and things like water efficiency probably come fairly low down the list.

Q768 Lord Whitty: Given that the market is not likely to demand it, what about building regulations? They are currently being reviewed. What alterations in building regulations do you think would actually make a difference here so that all new developments and possibly some specific refurbishments were made more water efficient or, as an alternative, would you be prepared to countenance a situation where building regulations were rather more stringent in areas of water shortage?  
Mr Mitchell: If you look at building regulations as they currently are and then perhaps consider the Code for Sustainable Homes which is coming in, there is a water section in that under the six essential elements, and the consultation at the moment in there is suggesting that houses should be designed to have a usage of 125 litres per person per day. If you consider that the national average at the moment is 150 litres per person per day, that is a 25-litre saving on the national average. That is potentially a 16 to 17 per cent saving. That is good, but that is only on 150,000 new houses each year. As it is structured, it does not currently affect the 25 million existing homes. There is far more potential for doing something on existing homes and we have asked for the Code to be altered to include existing homes.

Q769 Lord Whitty: What about the point about the differential because, yes, it is 150,000 houses but quite a lot of those are in areas of water shortage. Would it be possible to have a system in the South East that required a rather more stringent form of building regulation than it would in Cumbria?  
Mr Slaughter: Obviously in principle it would. To go back to your first question as well in answering this one, we have traditionally favoured and continue to favour building regulations as an approach to promoting good standards in this and other areas of building performance, an important reason being that they are a national framework. Okay, they are a national minimum framework but they are a national framework. One of the problems about regional differentiation would be that it would not necessarily lead to the right economies of scale. If you look at some of the points that came up in the previous evidence, from the developers’ point of view this is not just about what people value in the homes that they are buying, it is also about the ability to work efficiently with supply chains. If you have differential standards in different parts of the country you are potentially fragmenting the supply chain nationally for particular innovations or product, so I think we would want to look very carefully as those kind of issues and whether we have a helpful approach. Certainly one of the concerns we have about the evolution of issues around the home is the fact that we are worried that different elements of the Code may be picked up in local planning policy by the—
Chairman: I am afraid we will have to suspend.

The Committee suspended from 5.09 pm to 5.19 pm for a division in the House

Q770 Chairman: I would like to go on to discuss meters. Are there remote reading meters? I suppose water companies like to have the meter at the boundary of the property, do they not, to detect leakage, but do people make meters that will give you a remote reading inside the house?

Mr Mitchell: I am not 100 per cent certain of that. I have heard of them on some electric schemes for electric meters but I cannot honestly say I have heard of it for water meters. However, in this day of technology it should not be beyond the wit of man to, shall we say, innovate and get one of those. That is a very good consideration and a very valid point. I can find out for you certainly.

Q771 Chairman: It might be interesting to look at the range of meters that there are. Would you like to tell us how well you think building regulations are being adhered to with respect to water?

Mr Mitchell: I think they are being adhered to very, very well with respect to water. I do not think there is a problem there at all. There is certainly not a problem that I have been aware of from either local authorities, the ODPM or indeed our members.

Q772 Chairman: And what about enforcement? We do not have regulations requiring upgrading yet, do we, so a new house will be inspected and if it is not adhering, for example, to double flush toilets then some enforcement will take place?

Mr Mitchell: In theory the building control body should not sign it off.

Q773 Chairman: What is your view on the Eco Homes Standard and the proposed Code for Sustainable Homes? How would the industry react to the elements of the Code relating to water becoming compulsory?

Mr Mitchell: As we understand it, the Code will replace Eco Homes and what we do not like is extra layers of regulation so a code that replaces a regulation, in our view, eases the problems we have with regulatory matters. The Code as it currently stands with its water requirements—and the water requirements is one of the six basic, essential elements—ask for 125 litres per head per day. If we have a concern about it, it is that that might mean the end for power showers in new homes. Our customers really do want power showers and our fear is that they could then go out to their local DIY shop and buy a power shower and retro-fit it. It would not be as efficient as the ones that we were fitting which would be a retrograde step on the water side. There is also the safety aspect. Do we really want our customers going out and mucking about with water and electricity and fitting it for themselves? I do not know.

Mr Slaughter: Yes and the other issue is specifically—and we are talking about the entry level of the Code here, the first level of the Code—is sustainable urban drainage systems which would be required to meet that level of the Code and, as we have already said, developers are very happy about introducing sustainable urban drainage systems but there is a problem in terms of their adoption by sewage authorities at the moment. We have made these points to the Government on a number of occasions that if they are seeking to promote a Code whereby that is a minimum requirement to meet the standards of the Code then something needs to be done about the regulatory regime that will assist the adoption of such systems. So specifically on the entry level of the Code we have those two areas of concern. Interestingly, one is about regulation and one is effectively about consumer behaviour which we talked about before, and it is part of the reason why I made my introductory remarks. The Code has good and bad features from our point of view but we do not think that it can be the answer on its own because we need to look at other complementary actions along with it.

Chairman: That was a good point.

Q774 Baroness Sharp of Guildford: On your web site, you state that “new homes can . . . save water by using sustainable drainage systems and rainwater harvesting systems”. What proportion of new homes include such systems? How do you promote these systems and try to persuade home buyers that they are desirable?

Mr Mitchell: You are right, that is on our web site. I would have to say I would have thought its take-up in new homes is only about 50 per cent currently, but it is certainly the way forward and it is the way we would want to promote those two items. The rainwater harvesting systems really start to happen when you are doing Eco Homes because there are extra points available by installing those and that is where its major use is. Of course with the Code taking the place of Eco Homes, it will be included in the Code, although I think that is at one of the higher levels.

Q775 Baroness Sharp of Guildford: In terms of rainwater harvesting, are you putting in underground tanks for that or is it always just surface tanks?

Mr Mitchell: The vast majority of them are just surface tanks coming in.
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Q776 Lord Howie of Troon: I should perhaps declare an interest, Chairman, in that for several years up until the New Year I was a regular columnist in the House Builder magazine which I believe is published by these gentlemen, and a very good magazine it was. I dispensed wisdom, as best I could! Turning to the Regional Housing Strategies and their formation, what weight has been given to ensuring that planned developments for housing in various parts of the country, especially in the South East, are related to available water supplies?

Mr Slaughter: I will preface this remark by saying that sadly neither of us here today is planners so my answer probably will not be as good as it should be. I think essentially we would see that as something that the planning system at regional level would look at at a spatial level. Clearly housing needs to be integrated in terms of spatial strategy and spatial planning with planning for provision of necessary infrastructure, and we do not have a problem with that. From our perspective, the way we would see this is that we clearly have a major housing supply problem. We need to build more houses. The Government has recognised that so the question is how can we best supply that housing and provide the necessary infrastructure, whether it is water infrastructure, whether it is water efficiency measures that go along with the housing provision, or indeed any other infrastructure requirements, and we see that essentially in the planning system as a spatial regional issue rather than something that is very detailed and local and applies in any detailed way to an individual development, so we fully support the fact that that is an aspect of spatial planning. Whether that is being got right across the board I am not sure I can answer personally, but I think that is our perspective on how it should be done.

Q777 Lord Howie of Troon: I am told that in your response to the ODPM’s consultation on planning for housing provision you did not mention water at all. Why was that?

Mr Slaughter: Because it was not really part of the consultation. That specific consultation on planning for housing was really about land availability for housing. It did not address other issues so our comments were confined to the particular areas of interest.

Q778 Lord Howie of Troon: So you were not asked about water?

Mr Slaughter: We were not asked about water efficiency in that particular consultation so we did not address the issue in our response.

Q779 Lord Howie of Troon: But the supply of water to new housing is quite important, is it not?

Mr Slaughter: It is, yes.

Q780 Lord Howie of Troon: Should you not worry about it a bit?

Mr Slaughter: We do. We are fully accepting that we have a problem and recognise that we positively need to do better both on new build and existing stock, as my colleague has said on this, but that was not specifically the context of that particular consultation so we did not address it in that context. We were addressing it more in the context of the current consultation about the Code for Sustainable Homes and other related measures.

Q781 Lord Howie of Troon: You are thinking about it now?

Mr Slaughter: We are always thinking about it. If I may, I would like to broaden this out because for us we cannot just look at water efficiency or water management. We have to look at a range of environmental issues because there is a very major debate at the moment about energy efficiency. The Code touches on other aspects of sustainability, including waste management. From the industry point of view, we need a coherent policy and a regulatory framework that copes with all of these issues, and that was certainly not the context of that particular planning for housing consultation but it is very much the context of the consultation about the Code and related issues. On that I come back to my opening remarks to the Chairman, that we feel that there is a need for perhaps a bigger picture approach even than the Government has taken so far in looking at these issues because I doubt whether the Code in itself is enough. We need to address issues about consumer behaviour. We need to think about incentives that work for the supply chain and the development industry and we need to think, where appropriate, about planning policy but more generally about the structure of regulation. I think in our view an important set of issues that we have not yet touched on today is how the regulatory system itself can best incentivise innovation, and we would like to see a different approach in areas of building performance than perhaps the way in which we have been going. That is one of the positive features of the Code from our point of view, that it looks to be a less prescriptive approach that establishes particular performance objectives but uses industry’s more commercial scope to look at efficient ways of delivering those standards. We think that whatever the specific response on the Code there is some valuable thinking there that could be applied perhaps more generally, so we are certainly thinking a great deal about all of those issues.
Q782 Baroness Sharpe of Guildford: I have got one short question which I wanted to ask you earlier but then we had the vote. In your earlier evidence you said, very rightly I think, that there was considerable potential for pursuing water efficiency in existing homes as distinct from new homes. If that were the case what sorts of measures would you see being pursued and how is it best to incentivise those?

Mr Mitchell: I would start by saying obviously hearing the evidence that went on before—and I am a great advocate of water meters everywhere—I do think it would make people become more conscious of the way that they use water. It will stop the people who because they are paying a fixed charge have the sprinkler on all day; I am certain of that. Again, if the Code were altered to say it was 10 star instead of five star and that six-star entry was for new homes and stars one to five were for existing homes, this would be a way of starting to get the public to realise just how inefficient they are with water, when they are perhaps getting no stars on their existing house or one, two, three and four. It just gives a better scale of performance throughout the whole range of housing. If you take houses built round about 1950 the sanitary ware installed in those days had a 13-litre flush. In the dual flush we are talking about six litre and four and a half litre flushes. That is under half of what some old existing houses have. There is huge scope here. The big win here is getting the public aware of sustainability and just how some of these old houses, if you like, could save them a lot of money.

Q783 Baroness Sharpe of Guildford: Does the seller’s pack have to include anything on water efficiency?

Mr Mitchell: Not at present.

Q784 Baroness Sharpe of Guildford: It is only energy efficiency?

Mr Mitchell: Energy efficiency and energy building performance, yes. I am not sure it includes water.

Q785 Baroness Sharpe of Guildford: We could possibly try to extend that to water efficiency.

Mr Mitchell: Indeed.

Mr Slaughter: If I may add, and again this is really prompted by hearing the previous evidence, I was very struck by the tensions that the previous questions and discussion exposed between different drivers commercially and in terms of the regulatory structure for the water industry. As a layman, I would say that that did suggest that it is about more than just having water meters. It is probably about tariff structures being aligned with an agreed set of policy objectives that also work in terms of the investment climate for the water industry. So I think probably you would have to look at a fairly sophisticated approach to how you use these various factors to get a coherent and effective overall policy.

Q786 Baroness Sharpe of Guildford: Indeed, one part of the evidence that we received in Australia suggested that you have a low tariff to start with and you rise to a higher tariff.

Mr Mitchell: I think that philosophy should be used throughout energy—electricity, gas, petrol and water.

Chairman: Mr Slaughter and Mr Mitchell, thank you very much indeed. As I said to the previous witnesses, if you have more points that you want to make to us then please do so in writing but thank you very much indeed for your evidence. It has been very interesting and very useful. Thank you.
TUESDAY 28 MARCH 2006

Present

Broers, L
Patel, L
Platt of Writtle, B

Sharp of Guildford, B
Selborne, E (Chairman)
Taverne, L

Examination of Witnesses

Witnesses: Elliot Morley, a Member of the House of Commons, Minister for Climate Change and Environment, Department for Environment, Food and Rural Affairs and Yvette Cooper, a Member of the House of Commons, Minister for Housing and Planning, Office of the Deputy Prime Minister, examined.

Q787 Chairman: Thank you, Minister. I was going to suggest that the first five questions are very much addressed to the ODPM, but of course I would be delighted if you feel are also able to answer any of those questions, but do not feel driven to do so. For the remaining questions, I was going to suggest that Ms Cooper may not wish to stay. You know that we are completing our evidence on water supply in the United Kingdom. It does seem to be an issue which has caught up with us in terms of topicality as we have taken evidence. Is there anything that you would like to say to us by way of introduction, or would you like us to go straight into questions?

Mr Morley: Very briefly, Chairman, it may be useful to the Committee to point out that a lot of the issues which will be of interest in relation to, in particular, long-term water management and long-term resource management are covered under the Water Act 2003, which places a range of obligations on the water companies—obligations, for example, to have things like drought planning so that they have their drought contingency orders, which is very relevant at the moment in the south and southeast, and obligations to have forward plans, looking for a 25-year period in terms of the kind of resource demands that would be in that area. We have also set up a new Water Services Regulation Authority, which replaces the old Ofwat, although still a regulator, but the regulator has a board, which also increases the accountability of the regulator and it is also helpful in terms of taking into account some of the long-term planning issues in relation to the water industry. One thing which I might flag up to the Committee, which is an issue for my colleague Yvette Cooper as well, is that we are about to launch a review of the Water Fittings Regulations. This is an opportunity to see whether we can use the Water Fittings Regulations to improve the efficiency of devices which are on the market. A very common one, of course, is dual flush toilets, for example, but there are also aerated taps and efficient showerheads. These do not add a lot of cost to the fittings. In fact, I saw a house very recently which is being used by one of the water companies as an experiment and they actually had a meter fitted in each room, the kitchen and bathroom, to measure water use, and they have reduced water use quite considerably by a range of fittings of this type and they calculated that if you were fitting these as new or replacing them the additional extra cost was about £60—it was really quite modest. I know that my colleague Yvette is also looking at Part G of the Buildings Regulations, which covers the water consumption in new homes. So I think between us in relation to the Water Regulations and Part G that this is quite a significant review, which also demonstrates very close working between our two partners in term of the Sustainable Communities Objective.

Q788 Chairman: That is a very helpful introduction. I should confess that we are certainly going to be having divisions in the next hour and I apologise for that in advance, and no doubt I will apologise again on the result thereafter! I would just draw to your attention to the fact that there is a public information sheet for the members of the public, which gives our terms of reference and our interests. Let me start by asking a question which is specifically directed to the ODPM. To what extent did the ODPM consider the water resource implications when formulating the plans for housing growth in the southeast of England, and which stakeholders were consulted on this specific matter?

Yvette Cooper: There is a set of answers around the Sustainable Communities Plan, which was published in 2003, and then the further work we have done around the Barker Review response, which was just before Christmas. If I could start with the Sustainable Communities Plan approach? That identifies a series of growth areas, including Thames Gateway, London-Stansted-Cambridge and Ashford as well as Milton Keynes. The approach we took there was that those areas did not just come out of thin air; they emerged from the previous regional planning discussions that had taken place, the Regional Planning Guidance, the RPG9 work which took place and which I think was published in 2001. That obviously had a whole range of consultations with a wide range of stakeholders, including water companies and including all sorts of other agencies and stakeholders, and one of its recommendations was that Thames Gateway was a prime area for
regeneration and growth; secondly, that these other growth areas should be investigated for their potential for growth. So we actually chose those areas because they emerged out of the previous regional planning debate. We then also recognised at every stage that further consultation and further discussion would be needed about the precise location of homes and also about issues around things like the wide ranging infrastructure discussions, including water infrastructure but not just water infrastructure. We have had a series of further studies already done since, including things like the draft Milton Keynes/South Midlands Sub-Regional Growth Strategy, and also in particular some work around Ashford because we recognised that Ashford had some very particular issues both around wastewater treatment capacity and water supply and flooding, and so we funded out of the growth budget some particular additional research which has involved the Environment Agency, the local water company and the local council as well on that. The next phase of consultation really is underway at the moment, which is as part of the Regional Spatial Strategy. So, as part of the drawing up of the regional spatial plans, which will set out exactly how many homes should be coming through in different areas, including the growth areas, they are not only consulting with water companies, with the Environment Agency and a series of other stakeholders, they are also having that process being tested by an independent panel who can take evidence from a wide range of people as well. So I think there is not one single consultation on this but there have been a series of consultations which are still ongoing about exactly where the homes should be located.

Q789 Chairman: Could I sum up by saying that as a result of this iterative process and the regional planning debate it does appear to be the case that we are now encouraging huge housing growth in the very part of the country in which there is the shortest supply of water, and in the very area where one could expect to try and cut back on abstraction rates, which appear to have been over licensed anyway. Add to that, of course, the complication of climate change, all of which has a further degree of uncertainty, does this appear, on the face of it, to be a rather anomalous result of the debate? Yvette Cooper: I think what you have to recognise is that we are seeing population growth in the south of England, the east of England and in London. We are seeing that population growth anyway, but what we are also seeing is growing levels of overcrowding, for example in London; we are seeing growing numbers of young people staying at home for longer with their parents, but all of those people are still using water. The interesting research that we did as part of the Barker Review—because obviously I set out earlier the consultation as part of the Sustainable Communities Plan—was that we also conducted further research in advance of publishing our response to the Barker Review before Christmas, and the end result of the research, which obviously the Committee will have seen, was that it was obviously based on a whole series of assumptions about the levels of housing growth at the moment, and about different levels of future growth. But the interesting conclusion that it came to was that actually a significant increase in housing growth had a very, very limited impact on water demand, and the reason for that was that one of the greatest drivers is people rather than actual buildings, and that if you have population growth and if you have pressures on household growth in the regions anyway those people are flushing the chain, they are having showers wherever it is they are living, whether they are living with their parents or whether they are living in a home of their own. Therefore, I think you have to recognise that we have very considerable pressures in terms of demands for housing over the next few years. We have very substantial housing growth. We have to meet that demand but in response to it we have to make sure that we locate the homes sensibly, we make sure that proper water infrastructure is in place and we do things, as Elliot referred to earlier, where it actually improves the water efficiency of our homes so that we can reduce demand for water from the new homes as well.

Q790 Chairman: I do not think we can go into the calculations that you have drawn on in your commentary on the Barker Report but, nevertheless, all I would say at this stage is that we have had very conflicting views on that, which do not by any means tie in with your view. Mr Morley: Could I just answer that? I did mention earlier about the 25-year forward planning that the water companies will be obliged to do. They are consultees in relation to the structure plan so they are aware of the future projected housing growth, even in water stressed areas like the southeast, and they are building that into their plans. In fact the current five-year funding programme does include funding that will cater for an additional one million homes in England and Wales. In relation to some of the figures, which I find quite interesting, the findings of the report suggest that an additional 200,000 homes would produce an additional demand of 12 million litres of water per day by 2015. That sounds quite a lot but that actually would increase demand by 0.1 per cent of current water supply.

Q791 Chairman: That is a figure on which we have had contrary evidence, so we will have to tease that out.
Mr Morley: Those are the figures we have, Chairman.

Chairman: Yes, I know; we will have to look at that in more detail.

Q792 Baroness Sharp of Guildford: What is the Government’s estimate of the increase in domestic demand for water that will result from the housing growth in the south and east of England up to 2016 and 2031, as compared to the current demand for water?

Yvette Cooper: The precise level of the increase in demand for water will depend on a series of things. It will depend, obviously, on the final locations of the new homes; it will also depend on the new regulations that we want to introduce that will increase water efficiency in new homes. It will also depend on how far we can actually go in improving water efficiency in the future. Just as a brief example, yesterday we announced a new development at Northstowe in Cambridgeshire, which is going to be on public sector land, former MOD land, and we are aiming there to reduce the use of mains water by 50 per cent compared to traditional housing. That is an exemplar and that will be leading the way, but obviously you have to take those figures into account. The Environment Agency has figures around household demand being forecast to increase by 4 per cent to 8,300 million litres per day in 2010 and by 10 per cent to 8,800 million litres per day in 2030. We also obviously have the figures that we have quoted which were done as part of the Entec research as well. As I said, part of the reason that you get these different results from some of these surveys is because it depends on whether or not they take account of or control for population increase in areas, and so I think that is quite important and that is why I mentioned that as being a critical part of this.

Q793 Baroness Sharp of Guildford: Do the projections of demand themselves take account of, as you were indicating, some of the assumptions about the water saving in demand?

Yvette Cooper: My understanding is that these Environment Agency figures do not take account of the new consultation that we are proposing because obviously we have not consulted on that yet. They are the basis of the current practice.

Q794 Baroness Sharp of Guildford: The current demand as distinct from possible savings in demand, which you might be able to get.

Yvette Cooper: Yes.

Q795 Lord Taverne: Mr Morley mentioned that you are looking at the regulations to improve the water efficiency and sanitation in new homes, such as the toilet flushes and so on, and you said that they cost about £50 a house—and indeed it is a figure we have heard before. What progress is being made, and when do you expect to see these new regulations in force? And do you have any estimate of the savings that they may bring about?

Mr Morley: I can say that in relation to some of the estimates and findings of applying readily available fittings you could get between 20 and 30 per cent saving on water usage per household, and taken together that could be a considerable amount of water. The review has only just been announced.

Yvette Cooper: The time table we are proposing is to be able to go out for consultation this summer and what we are looking at is both Part G of the Building Regulations, but also the Water Fittings Regulations. It is not clear at this stage exactly which combination of those two that you would use because obviously the Water Fittings Regulations apply to water fittings that you can buy and that would therefore apply to existing buildings as well. Part G of the Building Regulations only applies to new buildings. So we are looking at both of those and what combination or what mix of the two you might need, but what we want to effectively consult on—it would be a joint consultation from our two departments—is proposals to increase the water efficiency. Obviously you get greater increases in water efficiency from existing homes than you do from new homes where we have already started to increase the standards.

Q796 Lord Taverne: When do you expect these regulations to come into force?

Yvette Cooper: I do not think we are able to say that yet. Obviously we would want to move as fast as we possibly can, but if you were going to effectively be impacting on the market, whether it is on house builders’ plans or whether it is on the manufacturers, then you have to have appropriate lead times and there are some standard lead times that are usually built into changes in those regulations. So I think we are probably not in a position to say at this stage.

Q797 Lord Taverne: If, say, savings of 30 per cent or, as the Environment Agency suggests, about 25 per cent are recognised would that be in time for 2016?

Mr Morley: Yes.

Yvette Cooper: Yes.

Q798 Lord Patel: The government has proposals for a Code for Sustainable Homes in terms of water efficiency and surface water management. In relation to that I have two questions: one, how ambitious are those proposals? Secondly, the government recently stated its intention to “strengthen the Code to support further improvements in environmental standards”. What impact will that have, and what
will be the likely impact of the WWF’s decision to resign from the Senior Steering Group?
Yvette Cooper: Obviously we were disappointed at WWF’s decision but we have had a series of meetings with them since and we have listened very carefully to the points that they have raised and responded to those. We have had a consultation now on the Code, which has concluded, and have said in response to that consultation that there is further work we need to do on the Code. But as our initial response to the consultation, first of all we will set minimum water efficiency and energy efficiency standards for every level of the Code because the previous approach, which actually was based on the old Eco Homes approach, was that you could trade off benefits in one area against lack of improvements in another, and we have said that we want to have a minimum standard for each level of the Code for water and energy. Secondly, that the levels of the Code need to be above the Building Regulations. I think it is important to remember that the Code is not an alternative to the Building Regulations; it is not an alternative to statutory regulation. The idea is that it will set out the future direction of statutory regulation, so it would say that these are our aspirations about where we want to get to over the next few years and how we should be going further than the statutory standards which, as we have said, we already want to increase; and what we want to do is to use developments like Northstow in Cambridgeshire to show the public sector support for how you can actually demonstrate that you can go further, you can use the Code to increase standards as well and that, as I have said, is aiming for a 50 per cent reduction in mains water use.

Baroness Platt of Writtle: In your written evidence you say that, “there is a further proposal that buildings in areas where water is scarce could be required to have a higher water efficiency rating, through a combination of highly efficient appliances and alternative sources of water, such as water recycling.” What is the current situation with regard to that proposal?
Yvette Cooper: That, I think, is something of the sort of thing at which we want to look further as part of the consultation. We have said for Northstow, for example, that we think we should be going for much higher water efficiency. There is another interesting question that you also have to take into account, that this is not simply about the availability of water but you also have to take into account the energy that is used as part of the water system as well. So as part of our broader programme around climate change we have to factor that into the equation as well.

Q800 Baroness Platt of Writtle: What scope is there for more regional variability in both the Code for Sustainable Homes and the Building Regulations, given the differing pressures on water resources in the different parts of England and Wales?
Yvette Cooper: Both the Code and the options for water savings under the Building Regulations do allow for some flexibility between regions but I think this is quite a difficult one to balance. There is an argument that says we should have much more regional flexibility because clearly the southeast is in a very different position to the Lake District, for example, in terms of the water pressures that they face. There is a counter argument which says that if you want market transformation and you want clear standards, for example in water fittings and things like that, then you should just have a single set of standards nationwide, and I think this is one of the issues at which we want to look further as part of the consultation in the summer. So I think we are open to representations and views on this.

Q799 Lord Patel: If it is not made compulsory do you think that the builders will comply?
Yvette Cooper: The important thing is to have compulsory standards that you increase, so the consultation we will do this summer will be on the compulsory standards for the building industry, with which they will have to comply when those are introduced. In addition to that we want to set out a further voluntary set of higher standards through the code which will set out where we think the statutory standard should increase to over time as technology moves on.

Q802 Lord Taverne: Could I ask a general supplementary? In looking at the various plans and your policies, how far do you take note of the experience of other countries, particularly Australia, which the Committee has visited, and where there seem to be some quite impressive lessons to be learned?
Mr Morley: We are interested in the experiences of other countries in relation to water management—not just water management but there are such things as tariff structures, for example, how you use tariffs to protect the poorest groups and also perhaps the idea of sophisticated tariffs which mean that those people who are the biggest water users pay a larger contribution. Defra is doing a study on tariff structures at the present time and we will of course consider the experience of other countries. We are also interested in how countries use water resource management as well as demand management. As you will also appreciate there are great differences between countries; there are differences even within our own country, within regions where we have the north of England where there is really no shortage of...
Chairman: Unless my colleagues have other questions specifically to the ODPM, Ms Cooper that ends the questions we would like to ask you.

Baroness Sharp of Guildford: Could I just ask one question about rainwater recycling? If you take a country like Australia the new houses that are being built there have very substantial tanks, and if you think about how much water is used in this country for watering lawns and this sort of thing, if we could save rainwater and use that for gardens it could be a very substantial saving. Are these sorts of plans in some of the exemplars that you are looking at?

Q803 Chairman: If I could add to that because it raises a further subsidiary question which is quite fundamental in a sense, which is to what extent would new developments always in the future be required to separate storm water from sewage water? The moment you put storm water into sewage it is effectively very difficult to recycle, and yet I think we all recognise that roof water and water off hard surfaces can and should be used for a multitude of sources, and yet are we adequately planning new developments let alone retro fitting to old urban settings?

Yvette Cooper: I think the idea of the Northstowe development is that we will be able to explore a lot of these issues and actually be able to look at the use of ground water and so on, and so that is part of the idea. We have only just completed the deal between English Partnerships and the MOD in terms of sorting out that public sector land to be able to be available for development. We are looking to see in what areas we might also be able to do this for the exemplar development, but really what we are looking at is what we can do in terms of the cutting edge, the work to really lead the way that we might not yet be able to do across the board in all areas but might be able to use the fact of these significant new developments as an opportunity to change the way things work, because we do take very seriously the issue around water and we do take very seriously the issue around the environment. I made the point earlier about the fact that we think the pressure is really coming from increased population and from the changing patterns of behaviour and so on, and therefore it is not a reason not to build new houses, but it may be that you therefore need to use the opportunity of building new houses to increase standards and to change the way we work. Given that we will need the new homes and given that we face those pressures on demand, let us use that as an opportunity to improve things for the future.

Mr Morley: There are some quite sophisticated rainwater systems which are on the market and they are designed to be built into new homes where appropriate. They would be eligible, Chairman, for enhanced capital allowances which the government provides for water saving devices. However these are for the commercial sector. Of course there is the simple rain butt and many local authorities and water companies have provided these either at a subsidised cost or, in some cases, including my own local authority, free of charge. I do find it surprising that in new buildings that simple rainwater catchment systems are not put in from the very beginning as standard as I am sure that would make a great contribution. I have one myself which I got from the local council, although in my excitement to fit it I did saw through next door’s down pipe, which was a little unfortunate! But it is a very useful device and more and more people are taking them up.

Q804 Chairman: As I say, I think we have come to the end of the questions specifically for the ODPM. Thank you, Ms Cooper for joining us today. I am afraid we cannot let Mr Morley off so lightly! Yvette Cooper: Thank you very much.

Q805 Chairman: If I could continue with the questions specifically to Defra. We note the Government’s decision to grant Water Scarcity Status to Folkestone and Dover Water Services. Mr Morley, do you believe that universal metering can have a positive long lasting effect for demand for water?

Mr Morley: Yes, I think it can and it is our ambition to see the majority of people on meters in due course in this country. There is an argument about how you encourage take-up and the Government has no plans to have a national compulsory strategy because, of course, there are differences regionally in relation to water resources. But companies do have the right under the Water Industry (Prescribed Conditions) Regulations to make an application for Water Scarcity Status, as you quite rightly say, and the first one that we received was from Folkestone and Dover and to date it is the only one we have received and the only one that we have approved. But the evidence is that water meters do reduce demand. There is some argument about what the exact figure is; it ranges from a minimum of 10 per cent up to 20 per cent, which is the findings of the Isle of Wight study, for example. Of course if you wanted to have more sophisticated tariffs then you do need water meters for that. So we do expect to see the majority of the country on water meters in due course.
**Q806 Chairman:** Is not the threshold of proof too high at the moment? As you say, there is only one water company which has achieved this Water Scarcity Status; they have to prove that they qualify. Why does it not become much easier if companies are prepared to introduce universal metering in their area?

**Mr Morley:** I think the reason being that water meters are but one tool; they are a very important tool but they are but one tool in relation to demand management. There are issues such as the water efficiency of fittings, for example, which we have been discussing; there are issues in relation to demand management and promotion of the efficient use of water by water companies, not least leakage rates in terms of addressing those. So we do expect in an application for Water Scarcity Status for all those issues to be taken into account. I think the balance is about right. All these things of course are open to review but at the moment the balance is struck between the availability of water resources and the range of demand management measures which the company is proposing, including water meters.

**Q807 Lord Broers:** In areas where there is going to be compulsory water metering what are you doing to ensure that the poorest and most vulnerable households will not be disadvantaged?

**Mr Morley:** There is certainly an issue of vulnerable groups. I was very interested that Folkestone and Dover did some quite detailed analysis on the economic impacts of compulsory water metering on their customers, and I welcome the fact that the company has taken the issues such as the impact of compulsory metering on vulnerable groups seriously. What Folkestone and Dover found, which I think is quite significant, is that 70 per cent of customers would pay the same or have their bills reduced where there is compulsory water metering, and 30 per cent would pay more. We do have in place at the present the Vulnerable Groups Regulations. These are to protect those people who are on low incomes and have large families and those people on low incomes who have medical conditions that cause additional use of water are eligible for protection under these regulations, which actually sets out a cap on what they would pay. So there is a limit on what they would pay, which is not then related to the water usage in relation to their circumstances. We also have a pilot scheme at the moment on affordability in the southwest, which I very much hope will give us some useful information about how we can look at what is appropriate in terms of the kind of regulations and measures that we put in place to assist vulnerable groups, because it is certainly an issue we take seriously.

**Q808 Lord Broers:** That cap is 3 per cent, is it?

**Mr Morley:** No, the cap is based on the average bill in the area of the company. The cap of 3 per cent is currently being applied to Northern Ireland, although that is in very different circumstances. In Northern Ireland there is a current move from general charging that was within the council tax, which householders pay, to full charging for water, which is what we have in England and Wales. That move could involve some quite sharp increases for consumers in that area so there is that cap, which is only for a transitional period of three years.

**Q809 Lord Broers:** There is some evidence in the southwest that pensioners might pay as high as 7 per cent.

**Mr Morley:** We are looking into this and it is why we have this current pilot scheme in the southwest, which is involved in providing free advice for people on low incomes—and pensioners is a case in point. Part of that advice, Chairman, is whether people are on a water meter; for a lot of pensioners, for example, they will cut their bills by going on to a water meter. But it also provides things like a benefit check to make sure people are claiming what they are entitled to. We have a similar scheme with Warm Front, which advises people on energy and provides grants for energy efficiency, but this scheme in the southwest also provides grants for water efficient devices. What we have found with Warm Front is that a lot of the most vulnerable are not claiming what they are entitled to, and a benefit check is actually very important, and I was really quite surprised with the Warm Front experience just how many people were not claiming their entitlements, and that is part of the approach that we are taking in the southwest.

**Q810 Chairman:** Is there any reason to think that the Northern Ireland scheme with the cap at 3 per cent might work here in the rest of the United Kingdom bearing in mind, of course, the different arrangements for the ownership of water?

**Mr Morley:** They are very different arrangements and I do not think that the Northern Irish experience is really comparable to the situation that we have in England and Wales.

**Q811 Chairman:** But it is a fact, is it not, that although you have these schemes which address the issues of vulnerable communities and higher water bills in the southwest and the like, that the uptake is sometimes disappointing, that not all people are availing themselves of it. So, in other words, the system is not working very well?

**Mr Morley:** The uptake is low, that is certainly true. Again, with Folkestone and Dover the company is looking to see how it can make people aware of the changes and aware of what is available. I think it is
quite appropriate that we constantly review the kind of measures that we have in place to make sure that they are effective and they are delivering the kind of outcomes that we want. That is why I have been very keen on the pilot scheme in the southwest in terms of water affordability and that may lead to changes in the regulations that we have nationally, Chairman.

Q812 Baroness Platt of Writtle: Can I just follow on on that because I think elderly people are actually put off applying, they do not particularly like it, and if it is very bureaucratic they probably do not want to fill it in unless somebody is prepared to help them fill it in. Do you look at that question? Because quite often there would be voluntary agencies that might help them, like Help the Aged. Mr Morley: That is absolutely right; I think that is a very good suggestion about the role of the voluntary agencies. In the southwest pilot scheme part of that is to provide help and advice to people to claim these various benefits and also to apply for the various schemes. But there is always an issue in a whole range of benefit and help in terms of making sure that they are not too complicated to put people off from applying for them. I know it is something that my colleagues in DWP wrestle with all the time, and it is certainly a consideration that we must take into account in the future design of any such scheme in relation to water.

Q813 Baroness Platt of Writtle: How can companies best tackle the increasingly high level of unpaid water bills, especially amongst those who can afford to pay but choose not to? South East Water told us that their analysis shows that two-thirds of their customers who owe money could in fact afford to pay. Mr Morley: There is an issue of debt. What is quite interesting, Chairman, is that the levels of debt vary really quite significantly between companies. It is clear that some water companies are much better at keeping debt down and chasing up debtors than others. I think what we need to do is to make sure that best practice is spread on these issues and I know that Ofwat and the new Consumer Council for Water are conducting a joint study into how issues of debt can be addressed and how the standards of the best can be applied to the standards of the worst.

Q814 Baroness Platt of Writtle: Would it be a good idea that water companies were allowed to partially disconnect those customers who can afford to pay their bills but consistently refused to do so, thus supplying only enough water for basic essentials? Mr Morley: It is an interesting suggestion and I know that it is one that has been made. I think it is worth looking at these ideas. As you will appreciate, Chairman, the government did take a decision not to deprive people of water because it is an essential service and of course it is important in relation to people’s health and welfare. But it is also fair to say that there are people who could pay who do not and of course the challenge is how you can identify the particular group between the vulnerable group and the people who just do not want to pay. But I do think we have to look at the range of options which are available.

Q815 Chairman: I think it is quite simple because once you have decided that they have not paid the bill you look at the circumstances. If you find that their income is such that they can pay you do what the Australians do, and they have the technology to provide a very reduced supply. Mr Morley: You do need the kind of meters that can do that, but it is an option.

Q816 Chairman: It is universal metering. Mr Morley: Yes, that is right.

Q817 Chairman: Clearly someone who is not intending to pay the bill will not get a meter. Mr Morley: They will in Folkestone and Dover! Chairman: So I think it adds to the case for universal metering perhaps. Baroness Sharp.

Q818 Baroness Sharp of Guildford: How would you like to see Ofwat’s new sustainability duty put into practice? Do you believe that Ofwat has acted in a sustainable manner thus far, particularly in terms of the funding allowed for infrastructure renewal and demand management activities by the companies? Mr Morley: I think Ofwat does take into account the issue of sustainable development and that also includes environmental management, water quality and catchments. There are clearly different issues and different responsibilities—catchment management, catchment planning, agri-environment schemes, how you apply them, but they are all interlinked, and I think that Ofwat did strike the right balance in the most recent price round by taking into account the advice of the Environment Agency, who are the Government’s statutory advisers in this area. Although there are economic pressures on the regulator both in terms of the demands of companies and both in terms of the demands of protecting consumers, I did see evidence of sustainable development being taken into account; and, of course, as you quite rightly say, it is a duty that is placed upon the regulator.

Q819 Baroness Sharp of Guildford: I think one of the issues that we have been wondering about is whether Ofwat, with their five-year price horizon, can take a long enough view on some of these infrastructure developments. One which has been brought to our notice is an Essex Water scheme for redirecting
supplies within the water area, where planning started in 1993 and the full development will not really come to fruition until 2014. It is a very long period and it does worry us slightly that Ofwat, in taking a view of infrastructure development, is essentially taking a five-year view.

Mr Morley: I think that is a fair point. There are some practical issues about how you are going to build that in relation to your price structures, but there is no doubt that the water industry is a very capital intensive industry; it is also a very stable industry in terms of giving long-term stable returns, but with the requirement for long-term significant sums of capital investment. There may well be a case for longer-term planning in relation to the financial side. Just to finish this, I know that the regulator is clearly reviewing the last year five-year price setting process and long-term investment.

Chairman: It is difficult to take a record of this. I will postpone the proceedings for eight minutes.

The Committee suspended from 4.39 pm to 4.47 pm for a division in the House

Q820 Chairman: Baroness Sharp.

Mr Morley: Could I just finish the point which may have been lost with the bell going off, which was that Ofwat are carrying out their own review of the last five-year price process to see whether or not there are changes that could be made and of course one of the changes is whether there could be a longer period in relation to some of the capital programmes and price setting, so we will have to wait and see what they say.

Q821 Baroness Sharp of Guildford: I think the other area we were a little concerned about was the degree to which Ofwat itself had, in a sense, input from the environmentalists and we wondered whether you might consider putting an environmentalist on to the board of the new Water Services Regulation Authority.

Mr Morley: The board does represent a cross-section of views, and quite deliberately so, and of course the board has introduced a level of accountability which did not exist before. It is also worth saying that in the price setting process the Secretary of State provides guidance to Ofwat and within the guidance of the Secretary of State there are issues such as sustainability and the environmental programme, and as I have said before the Environment Agency is our statutory body responsible for this. So I do not think Ofwat lacks for advice during the price setting process, they perhaps get more advice than they would welcome, I think, on occasions.

Q822 Lord Patel: You have already alluded to the Water Saving Trust.

Mr Morley: Yes.

Q823 Lord Patel: I have an additional question related to the Environment Direct service for the public. What services will that offer in terms of water efficiency?

Mr Morley: The idea of Environment Direct is to have one point of contact for the public—Internet based actually—for people who are interested in such things as energy efficiency ratings, labelling, perhaps some of these water fittings that people can buy at fairly modest cost and to fit, and the idea of Environment Direct is to provide that information and also to provide a portal that will guide people to other websites such as the Consumer Council for Water, for example, and the DTI. So Environment Direct, I think, could have a significant role to play in terms of promoting responsibility and also encouraging consumer choice, ethical purchasing and people using the power of their own pockets in relation to encouraging sustainability.

Q824 Lord Patel: So why not give the job to the Carbon Trust?

Mr Morley: The Carbon Trust provides a very good service now; they concentrate very much on the business side in relation to energy savings; we have the Energy Saving Trust who provide advice to the household side of things. They will be linked in with Environment Direct and we will guide people to those organisations; so if you are a householder and you are interested in energy savings, you are interested in what is on offer under the energy efficiency commitment, then you will be guided that way. If you are a small business you can be guided to the Carbon Trust and so be made aware of the grants and the support which is available to you.

Q825 Lord Patel: But not part of it?

Mr Morley: It will be linked in; they will all be linked in because each of these organisations have their own roles to play, they have their own websites, they have their own ethos. But we want to link them all up. We do not want people to be confused about the range of measures and bodies that are in our society because there are many, and the idea of Environment Direct is to have that one point of access and then people can be directed through it.

Q826 Lord Patel: Do you want to enlarge on the Water Saving Trust?

Mr Morley: There have been discussions about the role of a Water Saving Trust in the same way that we have an Energy Saving Trust, for example. We think at the moment that the Water Saving Group can provide all those services because the Water Saving Group has actually a very wide remit; it does have all the industry involved and it also has the consumer
body involved and the environmental body. The industry themselves have set up their own body called Waterwise, which provides advice on water saving. The water saving group is looking at such things as a voluntary labelling scheme on products so that people will be aware of the kind of water use that it has. So I think at the moment the Water Saving Group is really providing all the kinds of things that a Water Saving Trust would do.

**Q827 Lord Taverne:** What is your view on the construction of new reservoirs in the southeast of England since we, it seems, can expect increased rainfall in the winter and reduced rainfall in the summer and might need additional storage?

**Mr Morley:** I think it is inevitable that, given the changes in weather patterns, given the impact of climate change and also given the housing growth that we were talking about, that there will probably need to be additional reservoir capacity. Again, reservoirs are but one tool; that does not remove the need for water efficiency or effective demand management, leakage management—all these kinds of issues must also be taken into account. But I do know that there are plans for both new and enlarged reservoirs. For example, there are plans to raise the banks of some existing reservoirs which would have minimal environmental impact, but in some cases will increase the capacity by 60 per cent, which is quite significant.

**Q828 Lord Taverne:** What about new desalination plants?

**Mr Morley:** The water companies will have to make the case for the desalination plants. The desalination plants could have the advantage in that you could bring them on line at times of peak demand so that you can increase your capacity without, for example, huge expense on additional reservoirs. The downside of all this of course is that desalination plants are very energy hungry, and so therefore they require a lot of energy as part of the process and that increases emissions. So while you might be dealing with one issue of sustainability in water resources you are also having an effect in relation to emissions too, and I think that has to be taken into the equation.

**Q829 Chairman:** That brings me back in a sense to think about the twin-track approach, to which you referred in your evidence. You said in your evidence, paragraph 60, that the Government’s twin-track approach for water supply requires demand side management options, such as fostering behavioural change, use of new technologies and controlling leakage, to be fully deployed before new supply side measures are adopted. To many people the concept of a twin-track approach is not to have one after the other, given the timescale that Lady Sharp referred to earlier, but simultaneously. Do you really mean consecutively or did you mean simultaneously in your evidence?

**Mr Morley:** In the submission we were talking consecutively because there are huge costs in new infrastructure for water supply management and there are environmental consequences, particularly for new build. You obviously have to weigh up the costs and benefits of that investment and, as I say, when you have done those calculations in the end you may have to make that new capital investment. But I think it would be very hard to justify a new reservoir, for example, if you have a company with a very high rate of leakage. I think that the customers would expect the company to sort out the leakage before it builds a new reservoir, and I do not think that is unreasonable.

**Q830 Chairman:** But resource development is a long process.

**Mr Morley:** It is.

**Q831 Chairman:** And if you are going to delay it until you have completed all aspects of the other side of the twin-track approach are you not going to make a bad problem in the future a lot worse?

**Mr Morley:** We have to put this in the forward planning in relation to demand, but if you have poor resource management and you are not taking into account demand management either then I think that would be very hard to justify in relation to new infrastructure investment. So we do expect to see that applied and we expect to see that applied now by water companies. But, as I say, it may well be that that in itself is not enough in relation to demand and you may need these new resources. They are in companies’ forward plans, and sites, for example, of new reservoirs have been identified and in some cases in relation to planning and land protection are quite well advanced. But, nevertheless, that does not remove the need for tackling the issue of proper resource and demand management.

**Q832 Chairman:** That, I think, we would all accept, but does it not also exonerate from government the responsibility of planning ahead? The problem of government is always comprehensive spending reviews which take about three years at a time, and here we are clearly talking of a different class of capital expenditure.

**Mr Morley:** Correct.

**Q833 Chairman:** But you have to talk of capital expenditure which should be contemplated over 20, 30 even 50 years. Does it not seem rather weird to look on this consecutively therefore rather than simultaneously?
Mr Morley: I do not think so because I think the companies must demonstrate that, but the actual capital investment process is completely separate from Government in that the water companies are not part of the comprehensive spending review and I am sure they are very relieved about that, and they do have to make their bids to the regulator as part of their five-year programmes. But, as I say, Chairman, they must also have their 25-year programme as well and some of those 25-year programmes will have to address the issue of longer-term resource management.

Q834 Baroness Platt of Writtle: I have to declare an interest because I live in Essex, but we visited Anglian Water and Essex and Suffolk Water and, as you know, that is a place where there is a very large housing development plan, and whatever Ms Cooper says the water resources will be strained and are already strained and we have not had rain for at least two months. But we were very impressed with the long-term planning, which included bringing water in, possibly from the Trent, certainly down from Lincolnshire—and I was on the county council at the time when we had the Ely-Ouse scheme. Then they are thinking in terms of raising the level of the shores for the Abberton Reservoir.

Mr Morley: That is right.

Q835 Baroness Platt of Writtle: That kind of thing does not happen overnight, it does need to be thought out carefully and planned ahead. But we were very impressed.

Mr Morley: You are absolutely right and Abberton was the one I was thinking of in relation to the issue of 60 per cent capacity, and that is where the investment is going to go. You are also right that Essex can transfer water from Norfolk down to Essex and they have that capacity now, which of course provides them with a great deal of reassurance. However, we are in a drought period. Droughts do come and go but you cannot be complacent about these things, particularly with the issue of climatic change, and we do have to look at potential long-term changes in our weather patterns in this country and we must take that into account. In relation to the future proposed housing development in Essex, some of that is already within their current five-year plan and other parts of it will be in their forward projections in relation to their 25-year plan. So that is built in and it also takes into account expansion of Abberton and also the facility they have for water transfer.

Q836 Baroness Platt of Writtle: It does talk about longer term, that is the key thing, to give them time to plan it out properly and not to rush into it too late?

Mr Morley: No, it must be a long-term process because, as I said earlier on, it is an industry that involves long-term investment.

Q837 Lord Broers: While we are talking about timescales, may I ask you how confident you are that the Water Framework Directive timescales can be met, and how clear is the definition of “good” ecological status? Do you really believe that farmers and land owners are sufficiently aware of what will be required of them under the Directive and what are you doing to ensure they are prepared for the drastic action that may be required?

Mr Morley: We have provided funding for advisers in the catchment areas to go and visit farmers personally, to give them advice, and the Environment Agency has been bringing people together as part of its river basin catchment planning approach. It is an approach that I very strongly support, incidentally, because I am quite keen to see people involved in this planning, not just land owners but also local communities because there are issues here of biodiversity, water resource management and recreation as well, and lots of people have an interest in these issues. We do have a classification scheme which includes five ecological status classifications of surface waters. The highest, of course, is “high” and we are aiming to have most of our water courses, lakes, rivers and coasts to the “good” classification, and that work is currently underway.

Q838 Lord Broers: What are you doing to tackle diffuse pollution from the highways?

Mr Morley: While highways do indeed contribute to diffuse pollution, the biggest source is from agriculture where it accounts for about 60 per cent, but you are correct to say it is not the only contributor. Highways, run-off from industrial sites, for example, and even housing estates do contribute. A lot of new roads are being built with balancing ponds and those balancing ponds are designed to trap some of the run-off which comes from the roads. You can also, incidentally, use some of the balancing ponds and water management of road schemes as an
ecological enhancement. These ponds can actually provide biodiversity gains if they are designed and built in properly.

**Q839 Baroness Sharp of Guildford:** What is the latest situation with regard to the daughter Directive on Priority Substances? How realistic is it to reduce or to phase out entirely the discharge, emission or loss of the priority substances, and how much do you envisage all this costing?

**Mr Morley:** I do not have any evidence to suggest that it is not being deployed. You do have to go out to find

**Q839 Baroness Sharp of Guildford:** What is the latest situation with regard to the daughter Directive on Priority Substances? How realistic is it to reduce or to phase out entirely the discharge, emission or loss of the priority substances, and how much do you envisage all this costing?

**Mr Morley:** I think it is fair to say that there have been some delays with the progress of this daughter Directive. It is currently held up because there has to be an internal Commission consultation, and that is where it is at the present time. Our understanding is that we will get a decision from the Commission in two to three months on this Directive. The WFD itself does have a deadline date of December 2006 and, if there is no agreement by that date, Member States will have to set their own environmental quality standards for priority list substances. I very much hope that is not the case because I come back to the point I made earlier that I think it is a lot more desirable if you have common EU standards on these issues. So as long as the Commission can get the decision made within the next two months or so there is no reason why we could not have it.

**Q840 Lord Taverne:** How sensible are the standards being set? We have heard some evidence that they are not set on a scientific basis and compliance with them would lead to a considerable increase in the use of energy and the emission of greenhouse gases?

**Mr Morley:** Yes, I have heard these kinds of arguments. I am not altogether convinced by them. They are not entirely untrue but sometimes it is an excuse when people are not very keen on accepting higher standards. Like all these things, I think there is a balance to be struck. All you can do is follow the best available science on these issues and that is what we are trying to do.

**Q841 Chairman:** But that is the issue, is it not? Are we confident that the best science is indeed being deployed?

**Mr Morley:** I do not have any evidence to suggest that it is not being deployed. You do have to go out to find advice in relation to these kind of standards and we do have our own expert groups in the UK, and I have a great deal of confidence in the science base that we have in this country.

**Q842 Lord Taverne:** How confident are you that the Environment Agency will apply the precautionary principle, if they are clear what it means in practice, in a proportionate and appropriate manner when they are reviewing the consents under the Habitats Directive?

**Mr Morley:** There is always an argument about what is the precautionary principle and how it should be applied. I think the Environment Agency has a pretty good record in this area. We do consult as a matter of course when we apply these standards, whether it is the precautionary principle or whether it is others. We also do regulatory impact assessments and, where appropriate, environmental impact assessments which give us an idea of some of the cost-benefit issues so the measures which are being applied are not disproportionate in terms of the outcomes. The Environment Agency is very well aware of these issues.

**Q843 Chairman:** Unless any of my colleagues have any further questions to you, Mr Morley, I think that does this bring us to the end of this evidence session and indeed all our evidence sessions. Thank you very much for joining us today and we will think carefully about some of the points you have made and no doubt they will be of great help to us in writing the report. Thank you again for your help.

**Mr Morley:** Thank you, Chairman. It is always nice to come to the Committee.
Written Evidence

TAKE BEFORE THE SCIENCE & TECHNOLOGY COMMITTEE
(SUB-COMMITTEE I)

Memorandum by Anglian Water

Preamble

Anglian Water Services is the appointed water and wastewater undertaker providing water services to a population of 4.2 million over an area of 22,000 km and wastewater services to a population of 5.9 million over an area of 25,000 km in the east of England between the Humber and Thames estuaries. It is the largest water services company in terms of area supplied. The region is the driest in the UK receiving on average 600 mm of rain a year, which is two thirds of the average for England and Wales. In an average year three quarters of rainfall is utilised directly by the environment for plant and crop growth, this proportion increases in drier weather. The most recent periods of severe drought were from 1988 to 1992 and from 1995 to 1997. Demand restrictions were last imposed in part of the region in 1991. The availability of ground and surface water resources has led to their development in equal parts with the north and east of the region largely supplied by groundwater and the west of the region supplied by surface water stored in large pumped storage reservoirs. One of these, Rutland Water, has the largest area for a man-made water supply reservoir in Europe and is an internationally important wetland conservation site. The region has seen sustained economic growth during the last 50 years. Figure 1 shows the growth in the quantity of water supplied from 600 to 1,200 megalitres per day (Ml/d), although the quantity of water supplied has been relatively stable since 1990 as the result of increased management of demand, notably through domestic water metering with 56 per cent of households currently paying measured water charges. The major reservoir developments in the region all took place during the period 1960 to 1990 and are now approaching full utilisation.
BACKGROUND TO WATER RESOURCE PLANNING

1. In common with all water companies Anglian Water submitted an updated Water Resources Plan (WRP04) to the Environment Agency (EA) in April 2004. The plan was based on a detailed analysis of the balance between supplies and demands for the period 2005 to 2030. This analysis also formed the basis for the concurrent submission to the Office of Water Services (Ofwat) as part of the periodic review (PR04) of investment plans and water prices for the period 2005–10.

2. The WRP04 and PR04 are based upon standard methodologies developed by the water industry in consultation with the regulators. These are used to:
   — define the deployable output of sourceworks;
   — forecast the demand for water across all uses;
   — quantify the planning allowance needed between supplies and demand (target headroom); and
   — determine the optimal investment required to maintain a secure balance between supplies and demands.

3. The WRP04 confirmed that there is a marginal deficit of the available headroom (supplies—demands) below the target headroom in some areas and that this deficit would increase without timely investment in resource development and demand management. A programme for the investment of c£200 million in supply-demand schemes during the period 2005–10 was submitted to Ofwat that was substantially approved. This included increasing the output of Wing water treatment works, which is supplied by Rutland Water by 90 Ml/d. Figure 2 is reproduced from the WRP04 and shows the location of growth areas and the main schemes required to secure water supplies.

Figure 2: Strategic Water Supply Schemes
Projections of Water Supply and Demand

4. The factors likely to reduce headroom are growth from new development, climate change and a reduction in the availability of water resources due to environmental need. In combination these could pose a significant threat to water supplies, however the risks can be managed through the timely development of new water resources and further demand management, facilitated by progress towards universal metering.

5. The number of properties supplied by Anglian Water has increased from 1.6 million in 1989 to 1.9 million in 2004, or by an average of 20,000 properties per year representing an increase of around 1 per cent per annum, with the population supplied increasing in parallel. The forecast for the WRP04 was based on the planning authorities approved strategic plans that indicated a continuation of the historical trend. The sustainable communities programme announced by the Office of the Deputy Prime Minister (ODPM) in February 2003 indicated higher growth rates. However in the absence of details on location and timing this was not included in the demand forecasts in the WRP04. The recent publication by Regional Assemblies of Regional Spatial Strategies has provided more detailed information. This has been analysed to show that for the area supplied by Anglian Water the target for new development is of the order of 30,000 new properties per year, or 5 per cent more than was allowed for in the WRP04.

6. The potential effects of climate change on both water resources and the demand for water were considered in the preparation of the WRP04. The United Kingdom Climate Impact Programme gave advice on the impact of climate change in 2003 as scenarios referred to as UKCIP03. The scenarios predicted that on average there would be hotter drier summers and warmer wetter winters, with greater variance and more extreme events. The scenarios were used to model the effect on the yield of Anglian Water’s reservoirs that showed reductions in yield during drought conditions within a range of 3–12 per cent by 2030, with an exception of one, Alton Water. The effect of reduced rainfall during droughts was significantly mitigated by the return of treated wastewater to the upper reaches of rivers. Examples of this are discharges from Milton Keynes to the river Great Ouse upstream of Graftham Water reservoir and from Northampton to the River Nene upstream of Rutland Water reservoir. The exception was Alton Water, which supplies Ipswich where treated wastewater is discharged to tidal waters and as a result Alton Water could suffer a reduction in yield of up to 30 per cent. An assessment of the impact on the output of groundwater sources concluded that the reduction in yield would be limited to those areas close to the edge of the aquifers where they are thinnest. It was also concluded that the effect on average demand was likely to be small, although the impact on peak demands was likely to be more significant. As a result no specific allowance was made for climate change in the WRP04, although it was included as factor for uncertainty in the assessment of the requirement for target headroom and it is the main driver in defining target headroom by the end of the 25 year planning period. The need to invest for climate change impact will be reviewed in the next planning cycle in 2009.

7. The reduction of abstraction licences for environmental benefit, or sustainability reductions, can result from the EA invoking its powers as a result of a number of processes. These include the review of consents under the Habitats Directive (HDRoC) and the publication of Catchment Abstraction Management Strategies, which together with other current and future drivers form the Restoring Sustainable Abstractions programme. The Water Resources Strategy for the Anglian region published by the EA in 2001 envisaged sustainability reductions of 40 Ml/d being required by 2010 and 200 Ml/d by 2015. The provision for sustainability reductions in water company plans was excluded by ministerial guidance, which has outlined a process by which water abstraction charges will be increased from next year to fund a programme of compensation for licence and abstraction reductions. The situation for Anglian Water has been made more complex as a result of the EA’s policy in the Anglian region since 1990 to time limit new licences and licence variations authorising increased abstraction. The renewal of licences that may have an effect on sites designated under the Habitats Directive has to follow a process under the Habitats Regulations and has proved problematic. The EA’s Guidelines for the WRP04 excluded allowance for the non-renewal of time limited licences from the supply-demand balance analysis. To date licences and licence variations have been renewed to secure the availability of supplies, albeit at reduced quantities and for short periods to enable the HDRoC to be completed. This results in uncertainty in water resource planning.

8. Overall the process of water resource planning is well defined and robust. It is based on historical records of the availability of water resources during drought and takes account of most risks and uncertainties in the future through the allowance for target headroom. However there are areas where the process could be improved through the better implementation of regulation and better co-ordination between regulators. For example:

— early consultation on strategic regional planning options and the capability of water and wastewater services and constraints for their development;
— recognition of the time and investment needed to enhance water and wastewater services;
— facilitation of necessary infrastructure developments by environmental and economic regulators to ensure timely delivery in advance of need; and
— co-ordination of the implementation of new regulations to ensure that public water supplies are not jeopardised.

**Background to the Current Water Resources Situation**

9. In the Anglian region the period since the end of the 1995–97 drought has been characterised by a period of above average rainfall, punctuated by a rainfall deficit in the summer of 2003 and now representing a period of below average rainfall starting in November 2004. Rainfall, during the period November 2004 to April 2005 was recorded as 71 per cent of the long term average. However, as a result of the preceding wet weather, Anglian Water’s water resources have remained secure throughout 2005 with all reservoirs and borehole sources remaining within their normal operating range. Currently water resources are overall close to average for the time of year, with some areas being lower than others. The EA has declared the water resources situation in the Anglian region to be one of “potential drought”, due to concerns of low flow in rivers in Essex and south Suffolk. Concerns for the security of water supplies have focussed on rainfall and hence the recharge of water resources over the coming winter, with the potential for below average rainfall to result in lower river flows, reservoir levels and groundwater resources next summer. The provision for the onset of drought conditions is allowed for in our approved Drought Plan. Water resources are monitored through our own systems and information provided by the EA and the Centre for Ecology and Hydrology, such that the Drought Plan will be implemented if the situation requires.

**Supply-Demand Investment**

10. The WRP04 was based on investment in water resource development alongside demand management, following the “twin-track” approach. Water resource developments planned for the period 2005–10 will utilise existing unused licensed quantities through the construction of additional water treatment capacity and the transfer of treated water from areas with a surplus to those with potential deficit. The investigation of longer term options for the development of additional water resources includes increased transfers from the river Trent, water storage in new reservoirs in the Lincolnshire and Norfolk Fens and the return of treated wastewater currently discharged to tidal waters to inland waters. We would also use innovative technologies, such as the recharge of aquifer storage for recovery and desalination by membrane filtration, where viable and economic. Figure 3 shows potential future water resources developments in the period to 2030.

*Figure 3: Water Resources Developments until 2030*
11. The management of the demand for water has been actively progressed through the control of leakage to the level where it is uneconomic to invest in further reductions together with the more efficient use of water through the extension of household water metering and the promotion of the “waterwise” message. As a result leakage rates reported by Ofwat from Anglian Water’s pipes are amongst the lowest in the industry and meter penetration is one of the highest. The level of per capita consumption during 2004–05 for measured domestic customers of 125 litres per head per day compares favourably with unmeasured domestic consumption of 160 litres per head per day. The EA has advised the ODPM that water consumption in new development could be reduced by 25 per cent. A reduction of consumption for measured customers will require a step change starting with the incorporation of water efficient water fittings and appliances in the specification of all new homes. We have made representations to this effect in our submissions to the Regional Development Agencies for their Regional Spatial Strategies and support the revision to the Building Regulations to require water efficient design in all new developments at the earliest possible date.

12. The need to strengthen the Building Regulations was recognised by the Sustainable Buildings Task Group and its recommendation for a Code for Sustainable Buildings. However the efficient use of water requires not only the installation of low use water fixtures, but also education in their proper use and the adoption of “waterwise” habits. For example using washing machines and dishwashers with full loads and not leaving taps or showers running for longer than necessary. “Waterwise” behaviour can be encouraged but cannot be enforced and we support its inclusion in education curricula. In contrast industry, commerce and the public sector are motivated more strongly by cost savings and have achieved a significant reduction in measured non-household demand over the last decade. We actively promote savings through free water efficiency assessments and forecast that regionally non-household demand will continue to decline.

13. There are examples of water saving technologies such as rainwater harvesting and grey water re-use that offer a significant reduction in the use of potable mains water for sanitary use in new homes. We believe that the details for the design and operation should be properly investigated and confirmed before widespread adoption. The installation of domestic rainwater collection systems needs to be at least as reliable as catchment scale collection reservoirs, otherwise there will be an increase in the demand for public water supplies in critical periods. Similarly treatment systems for grey water re-use need to offer the same degree of reliability as conventional wastewater collection and treatment systems, otherwise customers will experience a loss of service and potential health risks.

INFRASTRUCTURE

14. Anglian Water is responsible for maintaining a water supply network of over 35,000 kilometres of water mains. The system has to be maintained to meet the leakage targets and levels of service for water pressure and interruptions to supply. It also has to be reinforced to meet the additional local demand from new development. Both growth from the sustainable communities programme and the likelihood of more intense periods of hot dry weather with climate change require an increase in peak outputs from sourceworks and peak flows through the water distribution network. Analysis shows that peaks in demand occur at different times of the week and season dependent upon local characteristics. For example peak demands in major conurbations are more likely to occur before school holidays, whereas tourist areas typically experience peak demands over a bank holiday weekend.

15. Historically the water supply infrastructure was developed on a local basis by a large number of small local authorities or private water undertakers. The consolidation of the 1974 restructuring of the water industry facilitated the development of links to enhance the resilience of infrastructure in response to peak demands, or the failure of a sourceworks due to a pollution incident, a major plant failure or a shortfall of water resources. The Anglian region network has been developed to give good connectivity in the north and west, however there is potential to improve links to provide increased flexibility, efficiency and security in the east of the region where growth rates are high and the available water resources are limited by environmental concerns and climate change impacts. Long-term investment in improving the resilience of infrastructure is limited by the periodic review process and we would welcome a more flexible approach.

REGULATORY FRAMEWORK

16. The regulatory framework for water management has grown significantly with the enactment of European and UK law during the last two decades. This has brought measurable improvements to the quality of drinking water through well defined regulation and funding mechanisms. Legislation has also ensured that sustainability criteria are applied to the abstraction and use of water resources. However the delivery of measurable improvements in these areas needs better definition of the required objectives and provision of the funding to achieve them. The implementation of further legislation in the form of the Water Framework
Directive provides an opportunity for the effective use of cost-benefit analysis and proper funding mechanisms. The issues are fully addressed in the Water UK consultation on “Future regulation for the water industry”, which we support.

INTERNATIONAL PERSPECTIVE

17. The UK is fortunate in enjoying a temperate climate, which provides relatively reliable water resources. These have been effectively developed and managed during the previous century through a succession of operational and regulatory models. The UK’s heritage of hydrological records provides an excellent basis for water resource planning and sound decision-making enjoyed in few other countries. Our legislative framework is based on sound principles for sustainable development through the enactment of European Directives. The standards and reliability of UK water supplies are higher than found in countries with lesser challenges in terms of population density and the intensity of industrial and agricultural activity. The UK water industry is well positioned to meet the challenges of continued growth and climate change, while delivering environmental improvements. However this will require the support of Government and more consistent and co-ordinated regulation to achieve a balance between the strands of sustainability for environmental, economic and social needs plus proper use of natural resources.

CONCLUSIONS

— Anglian Water has a robust water resources plan and strategy, although this will need to be adapted in the light of further information on regional growth, climate change impact and environmental concerns.

— The combined impacts of increased regional growth, climate change and environmental regulation will require the timely development of new water resources alongside the promotion of demand management through progression towards universal domestic metering, stronger regulation and controls for water efficient design alongside education in “waterwise” behaviour.

— Water supplies in the area supplied by Anglian Water have remained secure throughout 2005 due to the limited intensity and duration of the current period of rainfall deficit. The prospects for 2006 will depend on rainfall during the coming winter that will be monitored for implementation of our Drought Plan, if required.

— The historical development of water infrastructure has resulted in well-connected systems in the north and west of our supply area, but there is potential to invest in enhanced links to improve resilience through flexibility, efficiency and security.

— There is potential to improve regulation to implement environmental legislation for water resources alongside providing water supplies for planned new development and adapting to climate change by developing a clear common planning framework.

September 2005

Memorandum by Arup and Leeds University

What are the likely future trends in water demand, and what can be done to manage demand more effectively, and to influence the behaviour of consumers and others?

1. What are the likely future trends in water demand?

1.1 There are two major elements of water demand namely non-potable water needed by industry and agriculture and usually directly abstracted from rivers and ground waters and potable drinking waters supplied through water service companies and water supply only companies.

1.2 The majority of water demand is not measured. Even in regions where water meters are most common (the south west) supply is metered for barely half the population and nationally 80 per cent of households are not metered. There are many sources of water demand as listed below:

1. Domestic metered demand.
2. Domestic unmetered demand (very many).
3. Industrial and commercial metered demand.
4. Industrial and commercial unmetered demand (very few).
5. Operational use of potable water (say to flush mains).
6. Emergency use (say for fire fighting).
7. Illegal use (say from standpipes in a building site).
8. Leakage by the supplier.
9. Leakage by the consumer.
10. Error.

1.3 Input into the system is measured for large areas only and since few of the demand components are directly measured many of the components are estimated. However, since all these components have to sum to the total water supplied, the value of one component will change if the value of another changes. Thus, if demand at night time is deemed higher than previously believed, leakage “goes down” and vice versa. Clearly then, this is a very sensitive topic for the supply companies.

1.4 Water is arguably the world’s most precious resource. In developed countries such as the UK, society expects, and legislates for, a clean and reliable supply of potable water. Scientific investigation of potable water quality in the UK started in the 18th Century and is now claimed to be set at a standard far higher than necessary to safeguard health. Despite this, immediately following privatisation in 1989 of the water industry in England and Wales, the focus of water industry investment was on potable water quality. However, since the water resource problems of 1995–96, the supply of potable water has received increased attention. This attention has been further intensified by reports that current increases in demand (attributed to an absolute growth in both household numbers and household consumption) along with climate change-induced uncertainty over supply are forcing UK water resources closer to sustainability limits than ever before (Mitchell, 1999). On present UK trends, it is thought unclear that there will be sufficient water resources available beyond 2025 to meet demand (DEFRA, 2002a).

1.5 We are inclined to agree with the general consensus that UK water resources are closer to sustainability levels than ever before. We believe that if current trends in water use continue, that is, with the low penetration of measures to control or conserve demand, it is likely that demand in the future will be significantly higher than that observed today.

1.6 Households are likely to be the key driver of growth in future demands for water. In England alone, the Office of National Statistics is projecting that the number of households will grow from 20.2 million in 1996 to 24.0 million by 2021, an increase of 3.8 million, or 19 per cent. The projected growth in household numbers is due to an absolute growth in population, due to natural increase (excess of births over deaths) and the levels of migration and immigration, both legal and illegal. Prior to the mid-1980s, the UK experienced a net out-migration of population. Since then, there has been a net in-migration, which increased markedly in the late 1990s. The official figures show an average net inflow of 158,000 per annum between 1998 and 2002. It should be borne in mind, however, that out-migrants in particular are difficult to enumerate, and statistics are compiled from a number of sources that require some broad assumptions to derive the estimated totals. They do not include illegal immigrants, whose numbers can only be estimated.

1.7 Although the numbers of households in all regions are projected to increase over the period 1996 to 2021, the increase in household numbers is not evenly distributed across the UK. The South East, East of England and the South West are all projected to have around a quarter more households in 2021 than in 1996. In fact, the South East is set to have the greatest house building rate in the country. The Regional Planning Committee recommended an average of 28,900 homes a year for the South East region over the next 20 years. Although this annual figure will fluctuate over the 20 year period, the annual numbers are expected to be higher in the first 10 years to help clear the region’s housing backlog. For London and the East Midlands, growth is around a fifth and in other areas, projected growth is significantly lower. The North East has the lowest projected growth of just 8 per cent (ODPM, 2003). Further this focussing of demand will be exacerbated by the focus of hidden populations (asylum seekers, visa overstayers and true clandestine) in the south east and the focus of transient populations (say weekday workers in London living in informal arrangements) to the same area. Neither the hidden nor the transient populations are likely to be captured in normal water demand measurement systems.

1.8 There appears to be a strong relationship between those areas that are forecast to have a high rate of growth in household numbers and those areas that already display a potential imbalance between supply and demand. This is particularly problematic for the South East of England, which already displays an unsustainable or unacceptable abstraction regime (Figure 1).
1.9 A change in the current distribution of household size is also predicted alongside the absolute growth in household numbers. Household statistics from the Department of the Environment, Transport and Regions (2001) predict a 73 per cent increase in the number of one-person households and a concomitant reduction in average household size between 1999 and 2001 (Table 1).

Table 1

HOUSING STATISTICS FROM THE DEPARTMENT OF THE ENVIRONMENT, TRANSPORT AND REGIONS (2001)

<table>
<thead>
<tr>
<th>Households</th>
<th>1999</th>
<th>2021</th>
<th>Change (1999–2021)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total no. of households</td>
<td>20.7 million</td>
<td>24.0 million</td>
<td>3.3 million</td>
</tr>
<tr>
<td>One-person households</td>
<td>6.1 million</td>
<td>8.5 million</td>
<td>2.4 million</td>
</tr>
<tr>
<td>Average household size (persons)</td>
<td>2.36</td>
<td>2.15</td>
<td>0.21</td>
</tr>
</tbody>
</table>

1.10 These changes may be induced by a reduction in family size. Family size may be reduced by an increase in divorce rates, resulting in more single parent families or single person households. An improvement in levels of education may also reduce household size as the population become more career orientated rather than family orientated. However, this may simply be due to a delay in child bearing. It might also simply be a more complex set of living patterns with LAT households (living apart together) holding two houses with complex personal occupancy patterns.

1.11 Household size exerts the greatest influence on domestic water demands, with domestic water consumption increasing with greater household size. However, as household size increases, per capita consumption is reduced. The observed reduction in per capita consumption with greater household size is likely (i) because the number of persons in a household does not govern some water consuming activities such as garden watering and (ii) because appliance ownership per person is reduced with greater household size. An average reduction in average household size is, therefore, likely to increase significantly the future per capita consumption rate. Table 2 gives the per capita consumptions for various household sizes.
Table 2

AVERAGE PER CAPITA CONSUMPTION BY HOUSEHOLD SIZE
(Edwards and Martin, 1995)

<table>
<thead>
<tr>
<th>Number in Household</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Consumption</td>
<td>220</td>
<td>160</td>
<td>135</td>
<td>125</td>
<td>105</td>
<td>100</td>
<td>110</td>
<td>50</td>
</tr>
</tbody>
</table>

1.12 A further factor likely to influence future water demands is climate change. The general consensus in the UK is that climate change will result in hotter drier summers and warmer wetter winters. Such changes in the climate are expected to cause an increase in domestic water demands. The scale of this increase will undoubtedly be dependent on the absolute change in climate. According to Hulme and Jenkins, 1998, the greatest influence on household water demand, is in the South East of England.

1.13 Furthermore, the long held assumptions concerning water supply are being challenged by climate change. The assumption has been that sufficient storage is required only to serve the population over the summer and in winter the reservoirs are recharged ready to continue the supply cycle. We now appear to have evidence that winter droughts are becoming more frequent and we cannot rely on a single year of recharge.

1.14 The marked change in climate, in conjunction with the low penetration of measures to control or conserve demands, the absolute growth in household numbers and household consumption, will result in significantly higher demands than that observed today. The projected growth in future water demands is likely to vary by region due to differing house building rates and climates.

2. What can be done to manage demand more effectively?

2.1 There are a number of potential methods available to (i) meet the growing future demand in water or (ii) curb the growth in future demands. Options available to meet the growing demand for water include a national distribution system, which could convey water from areas where additional water is available (eg the North East of England or Scotland), to areas which require an increase in supply (eg the South of England). Although technically feasible, there are a number of environmental issues associated with transporting water around the country e.g. changing the diversity of habitats and species. Furthermore, the cost of delivering such a scheme is asserted to far outweigh the benefits. However, a national conveyor does not have to have the capacity to fully supply a region. It could be designed to provide the emergency needs of a region in times of extreme drought or major failure. Further, a national conveyor could be developed from simply providing regional support infrastructure between adjacent companies. Privatisation of the water industry has from most perspectives been highly successful. However, one unfortunate side effect has been that each company wishes to supply from within its own historic resource area or internally (for example, Yorkshire Water uses water exclusively sourced in Yorkshire while United Utilities sources primarily from Lancashire and Cumbria but historically from Wales). But prior to 1974 when many hundreds of water companies existed, each sourced water separately. Thus Leeds and Bradford, adjacent cities, had entirely separate supply systems but now 95 per cent of Yorkshire is served through a water grid that can convey water from Harrogate in the north to Sheffield in the south, from Hull in the east to Halifax in the west. So regional water conveyors already exist yet 30 years ago were out of the question.

2.2 Another technically feasible means of increasing supply to meet the growing demand for water is the use of desalinisation. A well established and proven technique in many arid parts of the world e.g. the Middle East and North America, with around 15,000 desalinisation plants already operational globally, is a potential means of increasing supply. However, desalinisation is an extremely costly option, and the future of desalinisation in the UK will undoubtedly depend on whether costs such as energy, membranes, concentrate disposal and chemical usage can be reduced further. The energy requirement of desalinisation is a crucial factor in the viability of this source.

2.3 An alternative method of meeting the growing future demand in water is to curb the growth in current and future demands through the use of demand management. Demand management is viewed increasingly by water utilities and government bodies as a potential means of aiding the security of future water supplies. There are two ways in which demand can be managed (i) by controlling demand and/or (ii) by conserving or displacing demand.
3. **Controlling Demand**

3.1 The UK is almost unique in Europe in that households are not generally charged for the amount of water used. The marginal cost of water is in effect zero, which promotes little incentive to economise on water use. Some believe that if customers are charged for water on a measured tariff, bill increases might result in the customer being even less willing to take measures to reduce demand (even in times of shortages such as 1995) (Environment Agency, 1997). Despite this, the overall consensus is that water metering with appropriate tariffs has significant potential to manage demand (DEFRA, 2002b). Evidence reported by Herrington (1998) suggests that domestic metering may have a significant effect upon reducing peak demands. Figures vary but trials have shown reductions of between 10–20 per cent for average demands and 15–30 per cent for peaks primarily due to immediate behavioural changes (Environment Agency, 1997). However, retrofitting of meters may not be economic in the short-term and invites unfavourable comment on access to this important resource. New housing is always supplied with metered water. Government might wish to consider whether alternative means of accelerating demand control through metering should be adopted. For example:

1. Might planning permissions which affect the water using potential of a house i.e. modifications to bathrooms or kitchens, attract conditions that require meter installation as part of maintaining sustainability within the development.

2. Should metering be a requirement on change of ownership? The £200 or thereby cost of meter installation would be minor within the duties and fees associated with house purchase yet statistically we move on average once in every 9 years so a significant proportion of the population could be metered in a decade.

4. **Reducing Demand by Conservation**

4.1 At present, the uptake of water conservation measures in the UK is relatively small and is generally only apparent where there is obvious economic gain. As part of the Periodic review, however, OFWAT has proposed a way of promoting efficient water use. If the cost of saving water by adopting a demand management measure is less than the cost of delivering additional water, then the company has a statutory duty to promote demand management measures. OFWAT has, therefore, stated that there is an economic level of demand management activity (OFWAT, 2002b).

4.2 Current water conservation measures include leakage control, water saving technology (e.g. pressure reduction valve and cistern displacement devices), wastewater reuse and recycling, water bylaws and education and awareness of residents. There are numerous studies that assess the impact on consumption of demand management measures. Whitcomb (1991), for example, estimated that per capita in-house water use would decline by 6.4 per cent due to the installation of water efficient showerheads. Similarly, dual flush devices were found to create savings of up to 64 per cent in water used for toilet flushing (Jones, 2002). On a larger scale, several major waste minimisation projects, including Project Catalyst in the Mersey Basin, have shown that a significant reduction in water use occurs through the adoption of cleaner technologies. The fourteen companies that participated in Project Catalyst have collectively reduced water consumption by 5.3Ml/d with measures that have paid for themselves in less than one year (Environment Agency, 1997). McDonald and Bellfield have examined the water saving of off-the-shelf retrofitted water saving devices installed to entire small communities and estimate that some 20 per cent water demand reductions are attained.

4.3 Despite (i) the proven capabilities of water conservation measures and (ii) the UK Government’s proactive approach in promoting demand management measures (primarily through the Environment Agency’s Demand Management Centre), there is currently limited interest in saving water in the UK. Some water conservation measures, such as direct wastewater or rainwater reuse, has been dismissed in the UK largely because of the possibility of cross contamination between the potable and non-potable systems and the consequent risk of harm to public health. However, the most likely reason why there is limited interest in demand management measures in the UK is there is little financial incentive to economise on water usage. Demand management schemes would be best implemented with customer metering and an appropriate tariff structure, which encourages demand reductions by introducing an economic incentive to reduce wastage, leakage and the uneconomic use of water (UKWIR, 2002). A water conservation and demand management strategy should, therefore, be a coherent whole and not a number of isolated, uncoordinated options.

5. **How can you influence the behaviour of consumers or others?**

5.1 We believe that it is possible to significantly influence the behaviour of consumers or others with regard to water use. Options available include:

— Making demand management a statutory requirement.
— Offering financial incentives to reduce water consumption.
— Using education and awareness programs to inform consumers about water use, the aim of which is to persuade consumers to change their behaviour.

5.2 In the UK, demand management is not currently a statutory requirement. In current building regulations, for example, there is some guidance on methods to reduce water consumption in buildings but these are by no means compulsory. One option is to introduce more stringent regulations associated with water conservation. This could be incorporated into future building regulations to ensure compliance and, hence, reduce water demands.

5.3 Labelling of water using appliances is also a potentially effective means of influencing the behaviour of consumers or others. Labelling allows purchasers and specifiers to make informed purchasing choices. It can be used as a basis for requiring minimum performance levels and allows manufacturers to compete on efficiency. However, the Australian version of water performance rating is far more robust than the European version. The Australian version could, therefore, be used as a target to aspire too.

5.4 We believe that financial incentives act as a potential means of reducing water consumption. Programs such as the introduction of Enhanced Capital Allowances for Water Technologies, announced at the 2003 budget, has the ability to encourage more efficient water use for industrial and commercial water consumers. Enhanced Capital Allowance Scheme allows businesses to write off 100 per cent of investments in qualifying sustainable technologies and products against tax in the year of investment. We believe that this Enhanced Capital Allowances for water technologies will give businesses a financial incentive to invest in water saving technologies. However, we believe that such allowances need to be more widely publicised.

5.5 Education and awareness programs are potentially the most cost effective method available to reduce water consumption. Within the water industry, a number of companies, such as Essex and Suffolk Water, have an educational policy, the focus of which is to educate young people to help them understand the need to save water within the region, and develop a more water aware generation of people in the future. Education programs should includes simple and efficient ways of reducing water consumption, for example, turning off taps while brushing teeth, filling kettles only the amount you need, get dripping taps fixed, using low flush buttons on duel flush systems.

6. Conclusion

6.1 We believe that if current trends in water use continue, that is, with the low penetration of measures to control or conserve demand, it is likely that demand in the future will be significantly higher than that observed today. However, with the effective implementation of methods to control and conserve demand, in conjunction with measures to influence the behaviour of consumers and others, growth in demand can be curbed; ensuring sufficient and sustainable water resources are available to meet demand.

October 2005

Memorandum by Association of Drainage Authorities

WATER MANAGEMENT

The Association represents the Internal Drainage Boards (IDBs) in England and Wales which provide a flood protection and water level management service in 1.2 million hectares of lowland areas. Whilst initially established to ensure the best agricultural land in the country was productive their work has provided the opportunity for varied land use which ranges from the heavy industry on Humberside, the tourism down the Lincolnshire coast, intensive agriculture in Cambridgeshire, to the high environmental areas in the Somerset Levels.

Despite the considerable development and other land use changes the areas managed by the IDBs include the most valuable agricultural land in which the substantial majority of vegetable and salad crops are grown, some exclusively, and embrace virtually all the Class 1 agricultural land.

The quantity and quality of the production is very dependent upon water management by the IDBs, and of course the individual farmers, for the on-field irrigation, of whatever type. No doubt in their deliberations the Select Committee will consider the importance of, and demands for, water in supporting agriculture and in so doing they may wish to consider the following—

— Set against the potential implications of climate change, and indeed other global impacts, should not the Government develop a long term policy for UK food production, which would consider the likely scenarios for water availability.
— In the lowland and highly irrigated areas IDBs both encourage and facilitate, where consents are necessary, the provision of storage of water during times of surplus.

— To further encourage such projects, either by individual farmers or with an IDB taking an “active” as opposed to “regulatory” role, consideration should be given to DEFRA providing grant support. This grant would be related to an environmental rather than productive benefit.

July 2005

Memorandum by the British Geological Survey

1. INTRODUCTION

1.1 The British Geological Survey (BGS) is Britain’s national geological survey and has been in existence since 1835. It assists both public and private sectors by advancing geoscientific knowledge of the UK landmass and its continental shelf by systematic surveying, long-term monitoring, effective data management and high quality applied research. It provides comprehensive, objective, impartial and up-to-date geoscientific information, advice and services in the UK and overseas, and disseminates information in the community to promote the public understanding of science. The BGS Groundwater Programme of the BGS has been working since 1935 to provide expert advice on all aspects of groundwater research, including resource mapping and quality evaluation, resource management and protection, and dissemination and uptake of research outputs.

1.2 Thus the BGS’ response to this call for written evidence is in relation to the management of the groundwater resources of England and Wales. Groundwater comprises some 30 per cent of England’s public water supply and this rises to over 70 per cent in the south east, with significant areas (e.g., Brighton) being totally reliant on groundwater.

2. THE PROBLEM

2.1 The financial and water resource implications of managing deteriorating groundwater quality

A 2004 study by BGS for UKWIR and the Environment Agency demonstrated the major impact of groundwater quality deterioration on groundwater resources. Using data from 1975 to 2004, 2,450 Ml/d or almost half of the total of 5,200 Ml/d of groundwater used for public supply is now sufficiently affected by deterioration in quality to require blending, treatment or replacement of source water. Using future scenarios based on this experience, within 25 years this could reach 4,300 to 5,700 Ml/d, implying that all groundwater would have to be treated, and this is clearly not sustainable. This deterioration has cost the industry some £755 million over this period at 2003 prices. Future capital investment to manage the impact of groundwater quality problems is likely to range from £73 million to £190 million for each five-year AMP period, and cumulative operating costs could reach £140 million by AMP8. However, the Water Framework Directive seeks to limit the introduction of new water treatment facilities, and in the study a scenario in which no further treatment or blending was permitted after the end of the current AMP4 investment (2009), a shortfall of some 1,800 Ml/d would have to be found from other sources by 2029. This shortfall would pose significant challenges to the water industry in terms of identifying other sources of groundwater because of the extent of existing exploitation, and alternatives such as new surface water impoundments, effluent reuse or desalination have very high costs and/or major environmental implications.

2.2 What price wetlands?

The safeguarding of groundwater dependent wetlands comes at some considerable cost and provides a good example of the frequent conflict between development and the environment. Protection of valley bottom wetlands, raised bogs and water courses is a requirement of the Water Framework Directive which will generally entail an assessment of the impact of existing and planned nearby groundwater abstractions. The cost of such impact assessments and any required replacement is significant and must be a significant feature of future water management financial planning.

2.3 Climate change

Climate change models (UKCIP02) predict that average temperatures will increase by up to 5°C by the 2080s, that winters will be wetter and that there will be an increase in the frequency of intense rainfall events. They predict that summers will be drier, and that winter and spring rainfall and summer and autumn temperatures will become more variable. In addition, they predict that soil moisture will decrease in the summer and autumn
in the south east and will increase in the winter and spring in the north west of the UK. However, it should be recognised that large uncertainties are associated with some of these predictions.

Whilst these various changes in climate are important for water resources, the implications for groundwater resource quality and quantity are not yet fully understood. However, it is probable that there will be an increased frequency of extreme events, ie droughts and floods. Shortages of water have an important effect on the economy, and whilst the groundwater resource is generally less sensitive in the short term than surface water to shortages of rainfall, those areas that are totally reliant on groundwater for public, industrial and agricultural supply will be severely impacted by successive periods of low recharge. As an example of the other extreme, the total cost of a groundwater flood event in Brighton in the winter of 2000–01 has been estimated at £800,000, and this excludes the cost of disruption of rail services between Brighton and London for five days.

Climate change will also result in changes in land use which in turn have important implications for groundwater—both quality (in terms of potential pollutants) and quantity (eg as recharge areas are developed).

2.4 Demographic change

A million new houses in south east England will require increased provision of water. Sussex is a target for growth yet the South Downs and North Kent Chalk aquifers are already supplying volumes approaching their long-term maximum capability. Whist demand management and improvement in distribution leakage systems will no doubt play a part in future supply strategy, it is inevitable that long distance bulk transfer of resources must also be considered.

2.5 Impact of the institutional and financial structure of the privatised water industry

The regulatory framework and financing mechanisms for the privatised water industry have some unintended but important influences on management. The cyclical asset management programme (AMP) process and its routine of five-yearly submission to OFWAT of investment plans for development of new sources and for treatment dominates technical planning within the industry. A consequence is that water companies strongly favour the engineered, treatment installation, end-of-pipe approach to dealing with groundwater quality to meet drinking water standards, rather than investigating point sources of pollution, and tackling them, or increased emphasis on groundwater protection to help reduce pollution, for example nitrate from agriculture. These latter approaches may often be cheaper, but have the inevitable element of uncertainty that the natural subsurface environment brings, and the hydrogeological settings and response times in many of our major aquifers mean that the benefits of protection (land use controls) and pollution remediation are not felt for many years. The privatised industry has a short-term view (the five year AMP cycle) and senior financial management is very risk-averse. The AMP funding process encourages the companies to seek approval for major engineering works and pass the costs onto their consumers. It is more difficult for senior management to fund investigation which may have uncertain outcomes.

2.6 Hydrogeological capability

The demand for hydrogeological expertise in both the Environment Agency and the Water Utilities continues to grow, in no small part due to the implementation of the Water Framework Directive and the planned Groundwater Directive. This situation has not been helped by the closure of two MSc courses in Hydrogeology in recent years. The Environment Agency (EA) is currently under a lot of pressure in its role of regulator for groundwater resources. With salaries consistently below the national expectancy for hydrogeologists, and an apparently high turnaround in staff, many EA staff lack experience in the area of hydrogeology. Thus EA staff are being led, of necessity, towards a non-technical “fit-for-purpose” philosophy of decision-making. This is founded on decision support systems, which may comprise simplified calculations and inadequate data. There is the potential for mistakes to be made which may result in significant costs to rectify. Appropriately trained and experienced staff must always remain key to appropriate decision making.
3. Supply and Demand

3.1 The groundwater resource

A recent document by the Environment Agency (Water Resources for the Future, 2001) indicates that significant areas dependent on groundwater for all or part of their supply are currently exploiting the resource at or beyond its sustainable capacity. This is particularly true for the chalk aquifer of south east England. Recent changes in legislation will enable the Environment Agency to revoke or modify groundwater abstraction licences where there is a demonstrable need to do so. This will of course have significant implications for some Water Utilities. Under the same legislation, all future abstraction licences will be time limited.

3.2 Groundwater resource management

The water supply industry developed chiefly from surface water resources with engineering solutions being used to address supply problems. As the availability of groundwater became more apparent it was initially the engineers who were responsible for its development with the science of hydrogeology only being developed from the 1950s. As a result water utilities are still largely managed by engineers who frequently prefer the “black and white” of seeing the water in store in a surface reservoir rather than the “grey” of calculating the hidden resource in an underground aquifer. As a result surface water engineering solutions are sometimes proposed when a groundwater alternative might be more appropriate. There is a clear need for education regarding the benefits of groundwater use, and for the groundwater fraternity to better sell their product, but at the moment groundwater in some areas (but not all—as noted in 2.4) remains under used.

3.3 Managed Aquifer Recharge

One option that can be used to augment the groundwater resource where conditions are appropriate is Managed Aquifer Recharge (MAR). MAR (also known as artificial recharge) occurs when natural recharge to aquifers is augmented through man’s interventions to increase the volume of water stored in aquifers. Schemes are largely intentional—hence “managed”—but unintentional recharge also occurs from leaky pipe work, irrigation seepage etc. Subsurface storage of water is attractive in that it has minimal surface impact, can be developed incrementally and is often more cost-effective than alternative solutions. A preliminary assessment of the potential for Aquifer Storage Recovery (ASR)—a variant of Managed Aquifer Recharge—in the UK was undertaken by BGS in collaboration with the EA and UKWIR and this has been followed by evaluations by several water companies. However, only one scheme, in the Sherwood Sandstone aquifer in Yorkshire, has been developed into an operational scheme. This technique warrants further evaluation in the light of ongoing developments elsewhere in the world to better quantify the potential at a national scale.

3.4 Improved coordination and cooperation in monitoring is required

The results obtained from monitoring programmes should provide essential information to feed into management decisions. Recent work by BGS for the Environment Agency and UKWIR to evaluate current groundwater quality monitoring practices of both the regulator and the industry have shown that there is considerable room for improvement in making the most effective use of their activities. In 2003, at the time of the UKWIR study, monitoring within the industry had, since privatisation, understandably become more focused on operational requirements, resulting in an overall reduction in monitoring of “raw” water quality at the point of abstraction. However, it is this raw water monitoring that provides information about the quality of water in the ground—the industry’s main asset. To enable the industry to play its part in the implementation of the Water Framework Directive, the 2003 report recommended a groundwater quality monitoring strategy for the industry. While considerable steps have been taken by the Agency and the industry to improve co-ordination and design of the monitoring to get the best use of existing funds, there are still big differences between approaches between regions.

3.5 Better use could be made of archived data in water management

Notwithstanding the above comment, the UK is in a fortunate position with respect to the amount of monitoring data available for both quantity (water levels) and quality of groundwater. However, both sides of the water industry put insufficient effort into the assessment, evaluation, interpretation and reporting of their accumulated data holdings; monitoring goes on routinely without the subsequent activities such as the analysis of trends in relation to both pressures on the groundwater systems and the effectiveness of responses
to observed deteriorations. These activities turn the data into information that can be readily used in management and that can be used to inform the general public about the need for water management and the ways in which our groundwater resources are being managed.

3.6 Protect or treat?

As noted above, water companies strongly favour the engineered, treatment installation, end-of-pipe approach to dealing with groundwater quality to meet drinking water standards, rather than investigating point sources of pollution, and tackling them, or increased emphasis on groundwater protection to help reduce pollution. With the increasing demands that implementation of the Water Framework Directive is placing on Environment Agency staff there is a danger that they will concentrate on the impact that polluted groundwater bodies will have on receptors (such as chalk streams) rather than understanding the causes of and pathways taken by the pollution.

3.7 Integrated approach to development

It is vital that an integrated approach is taken to future development—ie an approach that includes consideration of water resources (both groundwater and surface water) and the impacts of the future demand and potential quality implications of specific developments. An example of such an integrated approach is that of the Thames Gateway project where consideration of water resources is an integrated part of the development plan. It is essential that appropriate (water) science and data management are available to support the development process.

4. INFRASTRUCTURE

4.1 The water supply and drainage infrastructure is comprised of extensive, complex aging networks of pipes. Leakage from the supply network is generally not lower than 20 per cent and, it would appear, that the water Utilities are generally unable to improve upon that figure. However, the possible benefit as recharge to groundwater from leaking distribution systems in urban areas should not be overlooked when considering improvements to the system. In some urban areas (eg central London, Birmingham, Merseyside, and Manchester) a decrease in groundwater demand, following the decentralisation of industry, has resulted in rising groundwater levels. If left uncontrolled these rising levels can have significant impacts on the urban infrastructure eg flooding of basements, underground train and other tunnels, weakening of foundations and surcharge of the sewers. In the case of surcharge of sewers, this may not only lead to the possible need for increased maintenance of the system but also to increased quantities of water being treated at sewage treatment plants.

5. THE LEGISLATIVE CONTEXT

5.1 Legislation—can we afford the Water Framework Directive?

The current legislation with regard to groundwater is currently changing, particularly because of European legislation in the form of the Water Framework Directive and the daughter Groundwater Directive. It is too early to say whether the new legislation is effective. However, it is clear that there are significant cost implications in its implementation for the regulator and the water utilities. As noted in 2.6, the new legislation is making heavy demands on the water industry in general. It is pertinent to ask whether the Environment Agency is sufficiently resourced for the demands that are being and will be put upon it.

5.2 Lessons to be learnt from Europe in managing nitrate pollution

A current EU INTERREG project (Water4all), in which the British partners are the Environment Agency and the University of East Anglia, is investigating approaches to controlling the impacts of nitrate pollution. The Danish, Dutch and German partners in this project all represent areas where groundwater is used for public supply and where nitrate concentrations in groundwater are problematic due to intensive agriculture in the catchments of the supply sources. As part of the project, the small municipalities who own and operate the supplies are investigating (together with local farmers groups, householders, environmental groups and the regulatory agency) the possibilities of the water utility owning or leasing the land in the catchment nearest to the supply, and allowing local people and organisations to rent and use the land for non-polluting or less-polluting activities. This is feasible in these case studies, where the utilities are small, and under local...
democratic control, the individual supplies are small so that the controllable land is reasonably small and easily identifies, and also where the hydrogeological conditions are such that response times before some benefits are seen are not too long. It is harder to envisage this approach in the privatised industry of the UK, with much larger companies and a lack of local democratic accountability and influence; the relationship between water utility and customer is very different.

5.3 Failure to understand timescales in groundwater systems

The principal UK aquifers for large parts of their outcrops respond significantly more slowly than many of their counterparts in mainland Europe. Response time is the time required for a particle of water to travel through the unsaturated zone (from soil to water table) and the saturated zone (from water table to discharge point). Without going into complex geological detail, the cumulative travel times are often measured in decades. This is at odds with the normal political cycle, and the AMP process mentioned above. The early curtailment of the Nitrate Sensitive Area (NSA) scheme before it had time to show benefits in most NSAs is an example of this failure of understanding.

6. The Research Context

6.1 Some important aspects of groundwater management need further research

The conflict between water supply and environmental water requirements can only be expected to increase and research programmes have only relatively recently begun to address this issue. The current NERC thematic programme into Lowland Catchment Research (LOCAR) with a total budget of some £10 million considers the interrelation of surface water, groundwater and ecology at the catchment scale. These relationships are important for managing quantity, quality and environmental demand, and change seasonally, from year to year and at different points within catchments. However, the LOCAR programme is drawing to a close and can only really be considered to have “scratched the surface” of this complex interrelationship. Catchment scale research is essential for the underpinning of the Water Framework Directive. Whilst a number of processes are understood to some extent at the site-specific scale, upscaling to the catchment scale is not yet widely possible with any confidence. Also, with so many pressures on the current water resource, a benchmark or baseline of both its quality and size is required for appropriate monitoring and management to take place to minimise future degradation. The use and development of 3D models to integrate the research data, test conceptual understanding of the processes involved and simulate ranges of possible future scenarios is an important aspect of the research required to support future water resource management in England and Wales.

October 2005

Memorandum by the Broadland Agricultural Water Abstractors Group

Introduction

BAWAG is an association of over 150 agricultural and horticultural water abstractors based around the Norfolk Broads and North Norfolk area of East Anglia. BAWAG was founded in 1997. It represents the water interests of its members and acts as a forum for discussion of sustainable agricultural water management. BAWAG encourages its members to both have a greater involvement in water policy issues and to strive for wise and sustainable use of water resources.

We welcome the chance to submit evidence to this Select Committee inquiry, as our members are major abstractors of water and any changes to the management of public water supply will have a fundamental impact on our members’ management of water.

1. Defining the Problem

(a) What are the causes of the current problems of water supply, and how serious are they?

East Anglia is one of the driest parts of the UK. However, we have been relatively unaffected by the recent water stress. There have been no formal irrigation restrictions this year, but most of our licences have some form of environmental cut-off already in place.
(b) What are the projections for future water supply, and what factors will influence these projections? Where, and over what timescales, will problems emerge?

East Anglia has been lucky this year. But over the past few years BAWAG members are experiencing more irrigation restrictions and more long-periods of dry weather. As the CAMS process moves forwards and the European Habitats and Birds Directives are implemented our members are seeing the Environment Agency require cuts in abstraction licences or are finding it increasingly difficult to renew time-limited licences. These problems get worse on an annual basis.

We believe that with water companies having a statutory duty to supply water and with nature sites having statutory protection, farming is an easy area for the Environment Agency to claw back licences and restrict new applications.

(c) Is sufficient research being devoted to predicting, and handling, possible future scenarios?

Where is the water to come from for the 250,000 new homes in South East?

Government might be concerned why summer abstractors are not moving to winter storage despite 100 per cent first year allowances being available. The farmers are having problems funding the reservoirs.

(d) Is the response of Government, the EU, regulators and the industry adequate?

We believe that the Government needs to take a more strategic view of water resources in East Anglia. At the moment policy is being determined by individual licence applications rather than through a regional policy.

In the Environment Agency strategy “Water Resources for the Future” there were a number of policy actions laid out to improve the regions water resources. Many of these related to farming, such as working with farmers to develop winter storage, or working with farmers to improve efficiency. There has been little action on these policies.

There is competition between farming and public supply for water in East Anglia. We believe that the Government should provide full grants for farm winter storage reservoirs. This would enable groups of farmers to share reservoirs and to abstract high winter flows for use in summer irrigation, this would prevent the co-incidence of abstraction peaks between farming and public water supply. Alternatively, farmers could be provided with grants to build balancing reservoirs which would enable them to spread their abstraction over a number of weeks and to manage their water resources more effectively. Many farmers have looked at funding their own storage but it is costly and risky.

2. Supply and Demand

(a) What are the options for increasing water supply and what are the arguments for and against?

Farm winter storage reservoirs would enable more water to be used for public water supply in the summer months, they would also act as wildlife habitats and reduce the impact on water sensitive sites.

(b) What are the likely future trends in water demand, and what can be done to manage demand more effectively and to influence the behaviour of consumers and others?

Meter all water supplies. Build more reservoirs for the water companies and agriculture in the South East.

(c) What contribution can science, engineering and technology make towards reducing water use or waste by households, business and the public sector?

UK agricultural irrigation is already highly efficient; however the addition of efficient irrigation to the Water Technology List for Enhanced Capital Allowances would further promote efficiency. Also 100 per cent grants for reservoirs where summer abstraction is given up and balancing reservoirs would encourage farmers to store water.
3. INFRASTRUCTURE

(a) What is the current state of the water supply and drainage infrastructure? Is there sufficient investment in its improvement?

There need to be national goals to reduce surface run-off in all sectors. Water needs to percolate through soil to recharge aquifers, when water run-off occurs, the water is wasted. This leads to diffuse pollution problems.

4. CONTEXT

(a) The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at National and European levels, adequate?

There are currently few incentives for farmers to store water on their land. BAWAG members are well aware of the Wild Birds Directive and the Water Framework Directive. To solve our problems we need joined up thinking at all levels including Environment Agency, English Nature and Defra and positive solutions rather than negative policy.

(b) How does water figure in the development of both policy in areas such as housing, land use planning and industry?

Water shortages in the East of England may constrain agricultural irrigation and limit the rural economy. When water companies have a problem with supplies they will move the abstraction to another source, agriculture cannot do this without huge investment in parish irrigation schemes. The result of a water company moving its abstraction is that agricultural abstraction will be pressurised.

(c) What can the UK learn from the experience of other countries?

California has the Californian Farm Water Company, that has been very successful in safe guarding agricultural water supplies. Recently their water has been taken away to the City of San Diego and the farmers told to find alternative supplies. If the city has caused the problem of increased demand then the city should have found the new water.

EXAMPLES OF PROBLEMS IN BAWAG’S AREA AND POTENTIAL SOLUTIONS

1. Stiffkey River Catchment

This catchment is described as “over-abstracted” in North Norfolk CAMS. In response to this the abstractors set up “Stiffkey Farmers for a sustainable Chalk River” group. The solutions to their problems are building one or two winter storage reservoirs. Grants are available but there is no payback on investment where a farmer is changing from summer abstraction to winter abstraction. If government want to be successful in promoting more sustainable water use then 100 per cent grants ought to be available for storage reservoirs where summer abstraction is given up.

2. Bayfield Farms

Located in the Glaven Valley, where the river has been redirected to create a new habitat for Bitterns. This change will ultimately mean the creation of a new SSSI that will impact on the farm’s summer abstraction out of the river. The solution is to have a 100 per cent grant to construct a winter storage reservoir that will include the necessary infrastructure. The summer licence would be given up.

3. Walcott Farms

Walcott Farms run a large potato operation in North East Norfolk supplying Birds Eye, Heinz and McCains. Their current irrigation practice is to irrigate every day, regardless of conditions, to maintain the crop’s soil moisture deficits. They are not allowed an increase in their daily abstraction rate without an environmental impact assessment. The solution is to build a balancing reservoir, that is kept topped up from the borehole and irrigate at a higher rate but only when conditions are good such as at night and at low wind speeds. To encourage this farmer to be more efficient with his water a 100 per cent grant for the balancing reservoir ought to be available.
4. Alby Farms Ltd

Alby Farms Ltd is a large potato producer supplying Walkers Crisps. The farm has expanded its potato area onto adjoining farms but cannot increase its licence due to Boadland CAMS categorising the area as “over-licenced”. The farm cannot increase its daily abstraction rate without an environmental impact assessment. Its annual licence is sufficient for its needs. As with Walcott Farms, the manager would like to irrigate only in perfect conditions but has to irrigate everyday to keep the correct soil moisture deficit to ensure that the quality product is produced. The solution is to build a balancing reservoir but funding this efficiency is a problem to the farm. There should be 100 per cent grants to fund water efficiency projects.

Currently there are 100 per cent first year allowances on water efficiency investments but if farms are not profitable this allowance is not very helpful.

October 2005

Memorandum by CPRE Kent

1. General

Water availability assessments carried out by the Environment Agency (EA) have placed Kent in the highest category of stress in terms of the deficits for both river and groundwater resources. The Chalk aquifer of the North Downs which provides the county with approximately $\mu$ of its public supplies is rated, depending on location, as either over-licenced or over-abstracted; and the consequent impact on water table levels and spring-fed streams is such that the Agency has been obliged to give notice of its intention to reduce the authorised rates of abstraction from a number of public supply boreholes, as part of the Catchment Abstraction Management Strategy (CAMS) to restore Chalk stream baseflows to a status compliant with the European Water Framework Directive (EWFD).

One Kent water company, entirely dependant on groundwater sources, has now applied for “Water Scarce” status: this being a statutory pre-condition for implementing 100 per cent domestic metering throughout its supply area.

The following observations reflect what is essentially a Kent perspective on water management and draw mainly on exchanges with water companies and local authorities relating to the supply and environmental implications of planned growth in Ashford and Thames Gateway development areas. There are features of the Ashford programme in particular, which, we feel, have special relevance to the questions raised by the Sub-Committee under the headings “Defining the Problem” and “Supply and Demand”; as follows.

2. Defining the Problem

2.1 A number of supply areas in central and eastern Kent are currently subject to hose-pipe bans, reflecting the continuing delicate balance of resources throughout the county. The problems of supply and distribution are, however, exacerbated by the absence of a coherent water resource management strategy which is both environmentally sustainable and able to ensure adequate levels of service under all but the most extreme drought conditions. There are six separate and independent undertakings involved in the supply of potable water to consumers in Kent (more than any other county or area of comparable size). Each has its own suite of business plans and investment programmes and, as the recent history of take-overs and changes in company ownership has demonstrated, these can shift quite radically; and the regime is therefore not one which can be relied on to ensure long term consistency in the pursuit of key water management or public supply objectives. Furthermore, those schemes which eventually evolve from this process do not have the makings of a sustainable strategy for Kent as a whole.

2.2 The companies will almost certainly argue the contrary and will point to the work of the South East Water Resources Forum, established under the aegis of SEEDA and EA. This has certainly provided a useful meeting point for discussions covering a wide range of resource management issues, but it does not have a remit to formulate an optimum strategy or to direct water companies in its implementation. There is no such body. Examples can of course be found of joint schemes promoted by the companies but these are primarily business-driven and while they must satisfy the EA criteria relating to need, sustainability and environmental impact, they do not, even taken together, constitute a strategy which measures up to the demands that we already face and which will inevitably increase with the combined impact of planned development and climate change.
3. SUPPLY AND DEMAND

3.1 Water Supply Options

Again, adopting the Kent perspective, the question can perhaps be best covered by an example drawn from the proposals put forward during the consultation stage of the Ashford Plan. Detailed comments have already been incorporated in the CPRE response on the proposed core strategy options under the draft Ashford Local Development Framework. These are attached as Appendix I and summarised as follows.

(i) The Ashford Plan anticipates public supply demand (ave day, peak week) increasing from a 2005 base level of 39 Ml/d to 64 Ml/d by 2030.

(ii) The development falls entirely within the Ashford supply area of Mid Kent Water who have produced an outline programme for meeting demand growth throughout the plan period (Table 1A, Figure 1 and Map Figure 3).

(iii) The Environment Agency is also in process of finalising source development options as part of an Integrated Water Management Strategy (IWMS) for Ashford. (Table 1B)

(iv) None of the components of the Mid Kent programme has as yet been assessed for cost/effectiveness or environmental impact, and, for some options, there are real concerns relating to their viability in terms of drought yield.

(v) Substantial cut-backs in authorised abstraction from water company boreholes in the Great Stour valley are scheduled for 2015 in line with EWFD deadlines. These will account for a significant proportion of Mid Kent’s drought output for the Ashford supply area (Figure 2).

(vi) There are special concerns relating to the viability of Broad Oak reservoir (near Canterbury) which Mid Kent propose constructing in partnership with Southern Water and Folkstone/Dover. Two previous promotions have failed; the more recent, in 1990–91 with a design-drought output of 40 Ml/d, being abandoned in face of the restrictive flow conditions set by the regulator to protect environmental and water use interests. Fifteen years on, and with even tougher targets anticipated under CAMS/EWFD, there is even less likelihood of a successful promotion.

(vii) It is intended that storage in Broad Oak will be maintained by abstraction from the Great Stour below Canterbury. However, there is an increasing body of evidence pointing to a progressive decrease in the flow of the river, corresponding to a loss of more than 20 per cent over the last 40 years. This can be attributed to the impact of climate change, with reduced rainfall and increased evapotranspiration losses recorded for this area resulting in a 50 per cent reduction in the flow of springs feeding the river in its passage across the outcrop of the Chalk aquifer. If the trend continues, it is possible that by the end of the plan period there will be insufficient natural baseflow in the river to sustain the design drought output of the reservoir.

(viii) An alternative strategy proposed by CPRE Kent puts an emphasis on the indirect re-use of urban wastewater. Its practicability has already been demonstrated by the Langford Recycling Scheme, developed and operated by the Essex and Suffolk Water Company and which this year won an EA “Special Commendation” Efficiency Award. The Agency have now made provision for re-use of Ashford wastewater as a component of the IWMS. In light of this it is difficult to understand why the potential of wastewater re-use has not been given greater priority as a component of a wider Kent strategy. As an example, we have frequently cited the Margate/Broadstairs wastewater treatment scheme, for which Southern Water were, last year, granted consent for disposal to sea of up to 20 Ml/d of high quality treated effluent. This was in the face of strong representation by CPRE promoting the alternative of indirect re-use on the lines of the Langford scheme (Appendix II) and provisional estimates of capital expenditure compared with those for the sea disposal scheme indicate that it would cost no more to re-use it than to throw it away. This option is demonstrably more cost effective than the Bewl and Broad Oak developments and would also deliver a consistently higher drought yield.

3.2 Trends in Water Demand

Kent faces an unprecedented increase in public supply demand over the next 25 to 30 years, arising from:

(i) planned growth in Ashford and Thames Gateway;

(ii) increases in per-capita consumption, particularly at times of peak demand; and

(iii) the influence of climate change affecting both demand on, and availability of, resources.
CPRE have consistently pressed for the incorporation of water-efficiency measures as part of a twin-track strategy, alongside the development of new sources of supply; but so far, there has been very little progress. In the meantime Ashford is growing at a rate between 1,500 and 2,000 new consumers per year, and is already in year five of the plan period, with each year increasing demand by nearly 1 ML/day; and apart from the provision of meters, none of this will have been subject to obligatory water-efficiency measures.

We would favour a combination of financial incentives, based on domestic metering with an appropriate tariff structure coupled with water-efficiency measures and including:

- dual flush toilets;
- rainwater harvesting (for garden watering);
- efficient gravity showers (in preference to power showers); and
- grey water recycling.

Taken together, the four water-efficiency measures listed above would probably reduce the average level of domestic consumption by more than 30 per cent, assuming that the property has a metered supply and a tariff structure which encourages prudent use, particularly at times of peak demand. As to behavioural changes; other than at times of severe drought, there is not much evidence to suggest widespread public acceptance of the need for water conservation measures, and there would seem to be little appreciation of the likely future impact of global warming and its implications for the already delicate balance of water resources in the South East. Time is very short if we are to rely on the re-education of consumers and the water-efficiency strategy must therefore rest primarily on financial incentives under-pinned by local legislation. Serious consideration should therefore be given to the designation of Ashford as a “Water Scarce” area.

4. SUMMARY AND RECOMMENDATIONS

4.1. The indigenous surface and groundwater resources of Kent are already over-committed and cannot therefore sustain the planned developments in Ashford and Thames Gateway.

4.2. A new, Kent-wide, “no boundaries” strategy should be formulated as a matter of urgency exploiting the full potential of:

- water efficiency measures;
- indirect wastewater re-use; and
- strategic raw water transfers.

4.3. All components of the new strategy should satisfy the criteria of:

- environmental sustainability;
- efficient and prudent use of water resources; and
- best value-for-money for Kent consumers.

4.4 There should be an urgent review of the decision to consent the proposed Margate/Broadstairs wastewater disposal scheme and consideration should be given to implementing a feasibility assessment of the alternative option of advanced treatment and re-use for public supply.

4.5 A new body should be created with the remit to formulate and direct the implementation of the Kent Water Resource Management and Supply Strategy.

August 2005

Memorandum by The Chartered Institution of Water and Environmental Management

1. DEFINING THE PROBLEM

1.1 What are the causes of the current problems of water supply, and how serious are they?

Taking the “problems” referred to as being (a) those linked to the drought of summer 2005; (b) those that might arise over the current five year planning period; (c) those that might emerge over the longer term, in the presence of such effects as climate change, demographic change, regulatory change etc:
(a) The problems experienced in 2005

Rainfall was below its long term average in each of the nine months leading into the summer of 2005. This led to depleted groundwater resources in aquifers, reduced stocks in surface water reservoirs and low flows in river systems. In some areas, water companies had to appeal for restraint in the use of water by their customers, and a few companies made applications for drought permits and orders, to impose restrictions on the use of sprinklers and hosepipes, and to enable them to abstract more from their sources.

The 2005 drought is arguably the first significant drought of the last decade—there were more than 40 drought orders in 1996 in the aftermath of the 1995 drought but only three in 1997 and one in 2003. The number of restrictions imposed by water companies has declined markedly over the last 15 years not just because the period has been characterised by few droughts, but also because water companies have progressively and effectively integrated their resource bases to enable them to manage local drought difficulties rather better than was the case in previous decades.

That appeals and restrictions were needed in 2005 should not be regarded as constituting a problem. Appeals and restrictions are part of the water industry’s operating machinery for managing droughts, and we should expect them to be used when significant rainfall deficits put pressure on the ability of water resources systems to meet the unrestricted demands of people, so as to avoid unacceptable damage to the environment. People should expect to be supplied with good, wholesome water for essential needs (for drinking, cooking and washing), whatever the weather; but they should not expect to be able to draw water without restraint for non-essential uses, like garden watering, when rivers, lakes and aquifers are prejudicially low (or at risk of being so at some point in the future of a drought event).

If there was a problem in 2005, it was that appeals were not sought soon enough, not that they were sought at all. Water providers and environmental managers need to appreciate that “trigger to action” rules and response to situation approaches based on the patterns and policies of the past could prove to be less and less reliable in the future, as climatic and economic conditions change, as social mores change, and as regulatory requirements change (including the need to consult stakeholders more widely and more interactively than previously, and the need to manage catchments and environmental resources holistically and sustainably, in compliance with the provisions of the European Water Framework Directive). There is a need for new ways of working to be developed, tested and tuned to an unsteady climatic, economic and social reality.

(b) Problems in the current five year planning period (2005–10)

The Environment Agency (EA) has reviewed the water resources plans prepared by the water companies of England and Wales. It is of the view that all companies have sufficient supply headroom to meet appropriately managed demand throughout the period to 2010. Ofwat concurs with this assessment, though it has seen fit to draw attention to the fact that some companies in South East England would have to impose restrictions on demand should a severe drought occur in this period. As indicated above, CIWEM does not regard the use of demand restriction instruments in times of drought as a problem, but as a necessary and appropriate part of drought management.

We observe that a three season dry sequence (a dry summer followed by a dry winter followed by a dry summer, or, worse still, a dry winter followed by a dry summer followed by another dry winter) would severely test current systems and management policies in many parts of the country.

(c) Problems over the longer term

Water resources management is about providing sufficient resources to meet reasonable demands, sustainably, under most—but not all—drought conditions, over the long run. In England and Wales, the reference condition is a supply demand balance of at least 1.0 under drought conditions from 10 per cent to 1 per cent annual probability of exceedance (ie 1:10 to 1:100 years return period), given the adoption of progressively intensive demand restriction measures, in the form of appeals for restraint, through bans on unattended use of sprinklers and hosepipes, to standpipes in the street, in the 100 year condition (and, at the same time, progressive relaxation in abstraction restrictions, to enable more water to be drawn to meet essential needs, but mindful of the need to minimise adverse environmental consequences).

The water industry—together, the licensed water supply and wastewater undertakers, and their economic, environmental and quality regulators—is used to dealing with the uncertainties involved on both sides of the supply/demand balance. Demand varies and supply varies. The industry’s systems and procedures are designed to deal not with average, normal year conditions but with drought year conditions when resources may be considerably reduced compared to their normal year equivalents, and demands may be increased. This
is done in such a way as avoid undue and unreasonable costs upon people and the environment. The UK water industry is, in CIWEM’s opinion, appropriately structured so as to ensure that long term plans to achieve this goal are laid and tested, and that operational practice proceeds during drought events to ensure that the legitimate demands of both people and the environment are met without unreasonable cost, damage, or shortfall, to the other.

At present, levels of service for water use are reasonably well maintained, but there are medium to long-term threats to security of supply when the current freshwater resource base is set against contemporary projections of future water supply needs. This is epitomised via relationships at the catchment and resource zone scales between changes to water available for use (eg through sustainability requirements), security of supply indices and levels of service. Longer term, the industry is facing a series of challenges to maintain an appropriate balance between supply and demand given changes in demography, economic activity, regulatory change and climate change. The relative seriousness of these risks can be summarised thus:

— Climate change—serious.
— Housing growth and density—serious.
— Rate of use of water by customers—very serious.
— Increased quality requirements have precluded use of some resources—moderately serious.
— Leakage—locally serious.
— Underinvestment in resources & infrastructure—locally serious.
— Pollution of groundwater—serious.

To amplify on those that CIWEM considers most serious:

On climate change risks. Central estimates of climate-change influenced water resources futures indicate that current water management arrangements and systems will be able to manage likely increases in demand and reductions in resources, at least until the 2020s. However, other quite plausible scenarios with greater rates of warming and lower supply-demand ratios exist. We could easily suffer a much more severe drought than 1995–96, 1989–90 or 2005 in the near future, rather than in the 2020s or 2050s. Since strategies and plans need to be in place to deal with these possibilities, we should take the matter seriously and plan for it early. Are we doing so? CIWEM believes that we have started to do so, lately.

On housing growth, and the proposed Sustainable Communities Plan expansion of housing in the South East of England. The proposed developments will have a water efficiency saving target of > 25 per cent compared to normal homes, > 20 per cent compared to other new (and therefore metered) homes. This is welcome. But such savings amount to reductions of around 50 l/h/d compared to a normal (unmetered) household, and around 30 l/h/d compared to a new (metered) household. Evidence from the savings achieved from water efficiency programmes implemented to date indicates that such savings will not be achieved easily. Compulsory building regulations will be needed, and a concerted, sustained awareness and education programme aimed at the population at large will be required. Even if the efficiencies are achieved, the Plan will still lead to a large increase in demand in areas already under strain to supply (75 per cent of 160 l/h/d = 120 l/h/d x 200,000 new homes with an occupancy rate of say 2.3 persons per household = 55 MI/d = a large reservoir or 50 small boreholes). It is clear that savings will be needed from all households in the targeted regions, not just in the new ones, to reduce the need for new resource schemes, or increased use of existing water schemes.

On the rate of use of water by domestic customers. Domestic customers, in the main, appear to expect to be able to draw water without hindrance, whatever the circumstances, apparently unaware of the environmental opportunity cost (in respect of environmental impacts) and the marginal economic cost (in terms of the incremental cost of system enhancement) associated with maintaining unrestricted supplies in drought periods, and, crucially, apparently without appreciation of the true value of water. A major shift in the nation’s attitude to water is required, particularly with regard to a re-evaluation of its preciousness as an environmental asset, and not merely as an exploitable, on-tap resource.

1.2 What are the projections for future water supply, and what factors will influence these projections? Where, and over what timescales, may problems emerge?

Water companies assess the deployable output of their water sources (the volume of water they are likely to be able to yield in drought conditions of stated severity) under current climate and abstraction licensing conditions, and under possible future variants of climate and abstraction licensing policy. Climate change carries the risk of reduced outputs, compared to present, unless sufficient (natural sub-surface and engineered surface) storage is available to retain the higher winter rainfall forecast under most scenarios, so as to make
good the lower summer rainfall forecast in all scenarios. It also carries the prospect of more frequent and deeper droughts (and, at the other extreme, more frequent and deeper wet spells). Deployable outputs will be reduced in some areas (particularly in the South East) through sustainability reductions invoked under the Habitats and Water Framework Directives, unless proper provision is made for the replacement of lost output. Diffuse contamination threats to groundwater yield also exist. The combined reduction in output has been estimated to be as high as 3,000 ML/d, some 16.6 per cent of the 18,000 ML/d of water delivered in England and Wales.

Water companies could conceivably supply much greater volumes of water than they currently do in order to address these threats, but this would come at additional cost to the customer and the environment. Around 10 per cent of the available resource is tapped for water supply in England and Wales; but in some regions, the figure is already at 59 per cent. The cost of supplying more, whether by local abstraction or by transferring water from zones of plenty to zones of shortage, would be felt in both economic and environmental terms.

The key issue, of course, is the projection of the supply-demand balance (SDB). As noted above, there are medium to long-term threats to security of supply when the current freshwater resource base is set against contemporary projections of future water supply needs. These potential problems are likely to be faced soonest in the South East, where demand is greatest and supply is under most pressure—in general, and in particular in those zones earmarked for housing growth in the ODPM’s Sustainable Communities Plan.

1.3 Is sufficient research being devoted to predicting, and handling, possible future scenarios?

Considerable research is being devoted to the related issues of determining (a) how climate change may affect our climate, and thence (b) our water availability and water demand situations, and (c) how we might and should respond to the changed circumstances. It has taken some time for all parties in the industry to focus hard on the risks posed by climate change, but this is now receiving significant attention. Water companies are funding research through UK Water Industry Research (UKWIR) into likely changes and the uncertainties around them to allow them to prepare appropriate responses. The EA is also funding research into understanding the uncertainties surrounding climate change and its impact on water resources and demands, and the supply/demand balance, amongst other things.

Climate change is one of the variables being considered in planning scenarios. Economic and societal changes are also being examined through the Office of Science and Technology’s “Foresight” scenarios, which postulate various combinations of consumerism versus sustainability and local versus global actions by society. It is only now that such scenarios are being factored into water company water resources and demand balance plans, whereas in previous planning cycles climate change has been regarded as too uncertain a factor to justify significant investment and planning. The EA’s response is to seek sustainable and flexible (low regrets) solutions, such that actions taken are likely to lead to as desirable outcomes as possible, whatever the timing and magnitude of pressures that do in fact emerge.

Consideration of strategic management and operational management issues and options—in dealing with resource shortages, demand growth etc—lies squarely in the province of the regulators and water companies. Such research that is done in these areas outside of the inner circle of the industry (eg under EC funding) tends to be theoretical and somewhat esoteric, for want of access to real data and real context. We consider that not enough is being done in this area. For example, the responses of individual water companies to dealing with climate change is variable, partly commensurate to the risks each company faces, and partly hampered by lack of resources (skills, funding) to complete very detailed research studies required to check the robustness of drought and water resource plans to a wide range of possible future drought scenarios. Some companies have developed detailed operational models that help them to manage drought, others have not; some companies have secured funding for more detailed investigations into resource yields and climate change, others take the simplest possible approach.

Water companies are investigating the losses they are exposed to under sustainability reductions, and from contamination of groundwater sources, and are considering the various options open to them to make good such losses. Whether enough attention is being paid to these matters, and whether sufficient funding is being allowed as costs pass through is a matter of contention.

Overall, there has been a welcome growth in attention to predicting changes in yields and demands under plausible scenarios of the future. How to deal with the resultant changes has, though, received much less attention, to date.
1.4 Is the response of Government, the EU, regulators and the industry adequate?

In general, terms CIWEM considers that the response of the responsible parties is adequate. The UK Water industry approaches long-term water resources/demand planning via the so-called twin track model, which seeks to ensure that demands are managed down in technically viable and economically justifiable ways, and that resources are developed to meet managed demands, where necessary and in a sustainable manner.

There has in the past been a view that the EA has stressed the demand side of this balance rather more than the prudent development of new resources side (though the EA itself asserts otherwise, by reference to publications not just in its predecessor NRA era, but in 2001 and 2004, and notes that it is under guidance from Ministers to ensure that wise use is made of existing resources before new ones are sanctioned). The EA signalled their recognition in 2004 that appropriate water resources development will be necessary in the future, though they still believe water companies undervalue the potential gains to be had from demand management. For their part, the water companies point to the lack of compelling evidence to support the case for relying upon demand management, given their duty to ensure supplies to meet essential demand in all circumstances.

One area which CIWEM considers could be improved is the lack of co-ordination between the five-year cycle of the periodic review process and that of the European Water Framework Directive (WFD), under which River Basin Management Plans will be required to be reviewed every six years. It is suggested that Defra and Ofwat should move on from a five-year planning timeframe where longer-term considerations are not given enough attention, to a six-yearly periodic review which could be synchronised with the WFD review process. Six years plus six “indicative” plus 12 “prospective” ie 24 years ahead in total would constitute an approach which would allow proper consideration of long-term issues, particularly important where new resources may be required.

CIWEM considers it important that the twin-track approach be pursued with proper regard to ensuring that in the final resort, supplies for essential purposes can be provided in all parts of the country in severe droughts of plausible probability. We should plan, design and fund drought-resilient water resource-supply systems able to meet essential demand in droughts; but not systems to meet unrestricted demand in such circumstances, at unacceptable cost to the environment. This requires attention to raising awareness that restrictions on the use of water for non-essential purposes is an acceptable and responsible action in times of drought.

2. Supply and Demand

2.1 What are the options for increasing water supply, and what are the arguments for and against?

The options for increasing water supply security are encapsulated within the government’s twin-track approach. This involves both demand management (extension and promotion of water efficiency including changes to building regulations as appropriate) and, where justified, the development of sustainable local water resources and technologies for water conservation. The approach also requires the achievement of forecast reductions in leakage levels through leakage control, metering, and increased water mains renewals. It is thought that factors to be considered in arguments for and against the promotion of options for water supply security should include: levels of service, the relative magnitudes of water delivered and economies of scale, and sustainability.

The basic option for increasing supply is to increase storage. This approach is consistent with the climate change scenario of increased rainfall in the winter season but with much decreased rainfall in the summer season. Research to date has indicated that the impacts of climate change are less on groundwater and reservoir systems than run-of-river abstractions. Clearly, the location of additional storage is a very sensitive consideration with a very long planning horizon. The flooding of areas to supply distant conurbations has been contentious in the past, and in this context, the future is even more difficult given devolution of power to the Regions. With this in mind, we would suggest that any increased storage should be for local supply only.

The improved control and management of leakage over the last 15 years has in effect provided a significant resource that would otherwise have required further abstraction from the environment, or and significant (and earlier) demand management savings. In most areas and companies in England and Wales, leakage control now appears to be nearing the economic limit, to the extent that further benefits from this quarter are likely to decline asymptotically to the long term economic limit (which will reduce over time as technology improves, but at a declining rate).

Water reuse, whereby previously used water is recaptured, retreated and reused, remains a Cinderella subject in the UK water industry, largely because of public health concerns. Three types of reuse potential can be defined—greenwater from rainfall, greywater from washwater in the home and industry, and effluent from
water used for other purposes in the home and in industry. CIWEM considers that more needs to be done to realise the benefits of recapturing what is still largely a lost resource, whilst at the same time recognising that there must be strict definition and control of water reuse for the sake of public health. Returning appropriately treated wastewater from treatment works located near the tidal limit of rivers to upstream reaches of the same river is an idea whose time has surely arrived.

The costs for desalination have decreased markedly over the last decade but the potential for increasing carbon emissions is a cause for concern.

Summarising:

- Build more reservoirs—good for security of supply but could have adverse environmental effects.
- National water grid—very expensive, likely to be locally practical, only.
- Estuarine barrages—expensive, with issues beyond water supply.
- Desalination—expensive, energy hungry, waste disposal challenges.

2.2 What are the likely future trends in water demand, and what can be done to manage demand more effectively, and to influence the behaviour of consumers and others?

Broadly speaking, household demand is expected to rise at the rate around 0.5–1 per cent per annum of current demand (which is about 150 ℓ/h/d on average in England and Wales, and around 160 ℓ/h/d on average in the South East). Demand volumes (as opposed to per capita or per household rates) will rise most in resource zones targeted for population increases and housing increases, for example in those zones earmarked for development under the Office of the Deputy Prime Minister’s Sustainable Communities Plan. Demand from industry is now decreasing in most parts of the UK, because of the decline of primary and secondary industrial activity in the economy, and as companies have recognised the economic value to themselves of limiting water use and effluent discharges, in reduced supply and collection charges. Agricultural demand is also expected to decline, overall, but with peak demand in the growing season remaining high.

Demand is expected to change—with household demand, by becoming higher and peakier—under climate change scenarios. Central scenarios of climate change indicate the need for the nation’s water planners to plan increasingly for greater swings in water resources availability between wet spells and dry spells.

Current research indicates that the resource and the demand effects of changing climate are likely to become problematic after rather than before 2020. This is not to say that such effects will not be present until then; merely that they are likely to fall within the band of variability previously experienced under natural variation. It would be naïve to expect there to be a simple, smoothly-paced signal to climate change. To do nothing until 20 years or 30 years hence would, in CIWEM’s consideration, be unacceptable.

Demand can be managed more effectively by making individuals in society aware of the true value of water and the opportunity costs associated with excessive or imprudent consumption of those resources. Education and awareness might achieve substantial reductions in demand from the average consumption of 150 litres per day in England and Wales. More water efficient appliances can help, as can the use of more drought tolerant plants and gardens. In the end, though, it is creating the mindset that we need to become “low water-using people” that will make the difference.

The pricing mechanism can encourage individuals to be more prudent in their use of water resources. This would require metering on a larger scale than the 26 per cent penetration that currently exists in England and Wales, allied to much more frequent reading than is practice at present—which typically entails reading of meters only at six monthly intervals—so as to enable tariffs to be targeted appropriately to the task of saving water in areas of shortage and in periods of shortage. Rising block tariffs and seasonally-varying tariffs can achieve these ends in circumstances where individuals respond to the costs of the resource that they consume. On the other side of the coin, research shows that those individuals living in metered households can take the view that since they pay directly and pro-rata for the water they consume, it should be made available to them in whatever volumes they require. Thus metering can reduce the response of customer to appeals for restraint by water companies.

The whole matter of metering and its potential demand reduction benefits needs to be placed in the context of (a) the cost of metering—which increases incrementally, on a unit cost basis—and (b) the fact that the cost of water and wastewater services in England and Wales amounts to something in the order of only 2 per cent of average household income. Pricing may not be as effective an incentive to household water consumption as it has been in industry, where the cost of water supplies and wastewater treatment and discharge services can constitute a significant part of the total operational cost of the enterprise. That said, the requirement (under the 1999 Water Industry Act) that water scarcity status must be declared before water companies are
able to compulsorily meter properties is a hindrance in enabling companies to introduce economically-justified metering of high water-using customers (noting that properties with swimming pools, and all new properties, are already subject to compulsory metering). Socio-economic needs must of course be considered, but perhaps as part of welfare policy rather than water management policy.

2.3 What contribution can science, engineering and technology make towards reducing water use or waste by households, businesses and the public sector?

The science, engineering and technology sectors can make contributions in a number of ways:

(a) by developing technologies eg to facilitate reduced water consumption, improved/more effective treatment of wastewater, improved leak detection technology, and lower cost intelligent water meters;

(b) by educating, and raising awareness eg to inform people, communities and industries on the cost and value of water, and to persuade them to change habits and values;

(c) by undertaking research to better understand the characteristics and triggers of demand, at micro-component level, under varying conditions and contexts;

(d) by determining the ways in which water resources availability fluctuates from season to season and year to year under normal and man induced climate change circumstances;

(e) by developing intelligent optimisation systems for managing abstraction, treatment, distribution and collection processes, so as to avoid wastage and damage to the environment; and

(f) by developing and applying novel uses of emerging technologies from other types of industry without threatening public health.

3. Infrastructure

3.1 What is the current state of the water supply and drainage infrastructure? Is there sufficient investment in its improvement?

The treatment, distribution and collection systems infrastructure of water companies in England and Wales is a precious inheritance from far-sighted predecessors—particularly in respect of the collection systems developed in the Victorian era. Infrastructure is currently managed via reference to the concept of serviceability, wherein the service performance rather than the condition of an asset or system of assets is taken as the measure for renewal or upgrade investment decisions. It has been argued that an asset may be able to sustain performance to a given standard whilst its condition deteriorates. This risks a condition deterioration backlog that could lead to more catastrophic failure and to increased repair costs compared to a condition-dependent renewal/replacement programme. Many practitioners fear that the current state of water supply infrastructure and drainage infrastructure is just adequate for current needs, but inadequate for future needs.

There is also a view that whilst since privatisation water companies have invested billions in improving their asset base, to an extent that proved impossible in the publicly funded era, these improvement programmes have involved a higher proportion of short and medium life assets, such as automatic monitoring systems, than in the past. This means that assets have to be replaced more often and many of the short and medium life assets installed since privatisation in the late 1980s will need to be replaced or modernised through sufficient investments, in the medium to long term.

Scenarios of climate change involving more frequent intense rainstorms have highlighted the under-capacity of many combined storm sewer systems. The ownership and performance of the Sustainable drainage systems (SuDS) now under design and development are issues for attention.

4. Context

4.1 The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at national and European levels, adequate?

The 2003 Water Act placed water companies under an enforceable duty to further water conservation. The EA retains the duty to ensure the proper distribution and use of water resources. It is plainly the case that imposing the duty to conserve upon privatised water companies (whose primary function (and duty) is to supply wholesome water in sufficient quantities to their customer base, and to collect and treat the wastewater
after use) introduces an interesting and effective check upon any tendency to unrestricted supply that water companies might otherwise pursue. In this sense, the duty is properly placed on water companies.

The duty to conserve water resources is also properly placed on government, which has a responsibility to ensure that its citizens and organisations are prudent in their use of a precious resource. We therefore consider that the legislative and regulatory framework is adequate for present needs but will require constant monitoring and perhaps revision to encourage investment.

4.2 How does water figure in the development of Government policy in areas such as housing, land use planning and industry?

It is our contention that water continues to sit quite low on the list of priorities as far as issues such as housing, land-use planning, etc are concerned. Whilst planning policy statements do mention the need to consider water, such policy has not necessarily been embraced as fully by planners as we would like to see.

A key concern to CIWEM is that water companies are not statutory consultees in the planning process, and we assert that this situation should be changed. The Sustainable Communities Plan stands as an example of where housing growth has been targeted in those parts of the country which happen to be the driest, have the greatest current demand on water resources and are most vulnerable to the impacts of climate change. That the new communities will have ambitious water efficiency targets placed on them as a condition of development mitigates the problem, but it does not remove it—the water savings will merely reduce the increase in total demand (a 25 per cent efficiency target still leaves at least a 75 per cent increase in demand for resources, locally). We are pleased that recently, particularly in the South East, there has been greater engagement between planning bodies and stakeholders from the water sector. However, we consider that this has been due to the efforts on the part of the water industry to make their concerns heard rather than because of an official arrangement is in place whereby water issues are afforded full consideration within the planning process.

Whilst water resources planning operates on a twin-track philosophy (demand reduction and resource development in sustainable co-optimisation), housing policy appears to be following a one-track, “predict and provide” approach. The two do not necessarily sit easily together.

4.3 What can the UK learn from the experience of other countries?

The privatised water industry model of England and Wales is looked to and learned from by many other countries. The publicly owned model more recently developed in Scotland is also one which attracts the interest of countries considering reform of their own water sectors, where the prospect of privatised water companies earning profits in the provision of water and wastewater services is deemed to be culturally and / or philosophically difficult.

The UK water industry leads the world in much of what it does. At the same time, the UK can learn from the experience of other countries with regard to managing demand through metering and tariff systems. In places such as Singapore and Holland, customers receive bills showing consumption profiles and charge bands, with advice as to how bills could be reduced by changing water use, habits, patterns etc. We should seek to learn from such experiences, as we inevitably move towards a society that will have to value water more highly, and pay for it on a more rational basis. Learning from the experience of countries such as Japan, Singapore, France, Germany, USA and South Africa in the area of water and land management policy development and implementation would also be beneficial. The Californian practice of allowing increased use of water in one place only if balanced by reduction elsewhere in the same hydrological system is worthy of consideration, too (noting that it is already enshrined in flood management policy in England and Wales). Other examples worthy of review include:

— Windhoek, Namibia—treated sewage effluent is re-circulated directly to water treatment works.
— Singapore—treated effluent is supplied as process water to industry; planning permission for new industrial development is made conditional on the implementation of the most efficient water system available (with follow-up annual inspections to ensure that the system continues to be the most efficient possible).

On the other hand, there are instances of practice supporting economic development to the detriment of the environment that should not be followed. It would be invidious to name Spain in this respect.

October 2005
Memorandum by Professor Colin Green, Flood Hazard Research Centre

INTRODUCTION

1. There is widespread agreement that it is necessary to approach the management of water from the perspective of Integrated Water Resource Management (IWRM). This is taken to include integration across the different functional aspects of water management (e.g., across water quality and water resource management); between land and water management; and across catchments as coherent hydrological units. This concept underlies the Water Framework Directive. Delivering the “good ecological quality” prescribed in the Water Framework Directive is dependent not only on water quality but also on the dynamic flow regime and the geomorphological form of the river which is itself determined by the flow regime and by the processes of erosion and deposition.

2. We have to approach the management of water from the commitment of the UK government to stakeholder engagement, recently reinforced in the Government’s policy statement “together we can”, and the broader commitment of both the UK Government and the EU to improving governance.

3. We require to deliver sustainable development. This couples means to ends: it is necessary to make sustainable use of available resources but our purpose is to deliver a “just” society, as emphasised in the UK strategy on sustainable development. We may disagree what we mean by a “just” society, and have done so for thousands of years, but human aspiration is towards a society which achieves justice through just means. Hence, in some sense, we want to do “better” both in terms of outcomes but also in terms of decision processes. An important question is therefore: what do we, as a society, mean by “better”? This is obviously an ethical, moral, religious or ideological question. But any attempt at better management implies an answer.

4. It is a general truth that we manage water in order to make the best use of land, and our use of land then determines the water environment. England in particular is very short of land particularly in the South-East, the area under greatest development pressure. Here, the population density already exceeds 800 people per square kilometre; in addition, some 80 per cent of the land not already in urban usage is covered by one or other environmental designation.

5. In terms of water availability, the critical measure is the ratio of precipitation to potential evapotranspiration. This determines whether arable farming can be purely rain-fed or whether either rainwater harvesting or irrigation is necessary. Whereas all urban uses could be satisfied with perhaps 300 litres per person per day, growing the food to feed that person takes, depending upon their diet, between two and three thousand litres. Whereas we get most of the water used for urban purposes back, so that it is in principle available for reuse, the water used by the crops is lost. Hence, whilst it is often remarked that parts of the country have the same amount of water as Somalia, this is a misleading comparison because it is based upon the mean river flow per capita and takes 500 m³ per capita as a criterion of water scarcity. But if crops must be irrigated then 500 m³ is inadequate; if they need not be then 500 m³ is a multiple of the minimum requirement for urban uses. But of course both the rainfall and streamflows are already being used by the environment.

6. The Committee has elected to exclude flooding from its remit, for quite understandable reasons. However, one of the messages of Integration Water Resource Management is that it is necessary to integrate across the different functional uses of water. Specifically, we should not be considering water resources, droughts and flooding as three different issues. We should instead be thinking about managing the variability in water availability over time where droughts and floods are simply the extremes of the time series. Otherwise, interventions to reduce the risk of flooding may simply increase water resource problems and increase the risk of low flows. In addition, the greater the variation in rainfall and runoff over the year and between years, the more flood flows become the water resource and the greater the need to store flood flows in order to provide water in the dry season. Current predictions of climate change are of greater variability in rainfall across the year and between years. It is the variability in rainfall that resulted in Spain ending up with a system of plumbing in place of a network of rivers.

7. Any water management strategy must recognise that water management is energy intensive; water is heavy and incompressible and lifting water requires substantial amounts of energy. Traditionally, we have consequently sought to rely as far as possible on potential energy in the form of gravity rather than kinetic energy. Since all water is recycled through the natural hydrological cycle, the extent to which we can tighten that cycle of reuse is ultimately determined by the real cost of energy: both the financial cost of energy and its environmental cost.
Institutions

8. It is easier to talk of Integrated Water Resource Management than to deliver it. Since we are talking about systems, of which the water cycle is simply one system, a question that has to be addressed is: which form of integration is it most important to achieve? I would argue that it is integration between land and water management that is the essential form of integration rather than across functions or across catchments. If so, it is critical that the issues of water management be incorporated into the Regional Spatial Strategies and the subsidiary spatial plans. At the same time, spatial planning needs to continue to recognise both multiple objectives and multiple constraints and to avoid issues of water management becoming the sole determinants of spatial planning.

9. Catchment management exposes the “whole-part” problem which is arguably the key problem in any form of policy or programme planning. We seek a holistic approach which at the same time results in locally appropriate actions. In the old slogan: “think globally, act locally”. The problem is to bring the two together. A “top-down” approach risks leaving no scope for local choice, and hence for real engagement by the local community; a “bottom-up” approach may result in fragmented, unrelated actions which simply shift the problem around.

10. One of the problems of integration is that by definition any institution is defined by the formal or informal system of rules that govern it. Those rules are both functional and spatial in nature. They may specify what it must do, what it may and/or what it must not do, and where. Since there must be institutional boundaries, our problem is how to develop co-operation or co-ordination across institutional boundaries.

11. In addition, we have conflicting demands of our institutions: we need them to be adaptive to changing circumstances and innovative, but we also require them to be accountable. For accountability, we require that they demonstrate that they followed some system of rules. A system of rules that governs what actions the institution can and cannot do maximises accountability but restricts both adaptation and innovation. Systems of rules that prescribe decision processes and objectives increase the institution’s scope for adaptability and innovation but can reduce accountability.

12. In turn, if we want institutions that innovate then we want more successful failures and we have to accept such failures by our institutions. It is inevitable that some innovations will not succeed; if we do not tolerate some failures by our institutions, we will stifle innovation and we cannot do “better” except through innovation. By a “successful failure”, I mean an innovation which whilst it failed to deliver what was intended, it taught us something new and hence increases the likelihood that the next innovation will be successful.

13. That we must seek to be more adaptive and innovative requires that a key requirement is for institutional learning and the diffusion of that learning. We need to learn more quickly. One strategy would be to seek to create a water management community in the same way that Defra arguably has done over the last thirty years for flood and coastal defence. Their annual flood and coastal defence conference is successful in bringing together a range of stakeholders which I do not see occurring in other areas.

14. A continuing problem of integration is between disciplines; it is much easier to talk of inter-, multi- and trans-disciplinary work than to deliver it. The dichotomy here is that disciplinary approaches are arguably necessary to deepen knowledge but that practice requires synthesis across these approaches. I will return to this problem later.

15. All decisions are attempts to choose the future; presently, we can see a clash between two conceptual approaches to choosing the future and consequently as to the nature of uncertainty, as to what we can know about those futures between which we seek to choose. On the one hand, there is the perhaps dominant view that uncertainty can be expressed as risk and that risk can be reduced by research. On the other is the view that the future is inherently unknown and unknowable. That latter conceptualisation is that of Keynes, of Shell’s scenario approach to planning, and of the Adaptive Management approach developed by ecologists, notably Buzz Holling. Whether we argue that future is simply risky or unknown should significantly affect the courses of action we adopt and the processes by which we choose between alternative courses of action.

16. Since I am strongly biased towards the latter approach, I argue that all choice is a process of learning; we seek to discover which course of action to adopt and in the course of that process of learning, we hope to invent a better course of action.

17. In terms of the performance of the existing institutions, Defra’s policy document “Directing the Flow” is very good. That all aspects of water management were brought together when Defra was created is also promising. However, the consultation documents prepared in the run-up to the implementation of the WFD were singularly uninspiring and the criticisms of the House of Commons Select Committee on the implementation of the WFD were merited.
18. More widely, research into how to implement the Water Framework Directive has been undertaken in the UK and across Europe after it was implemented rather than either before the Directive was agreed or during the period between agreement and the Directive coming into effect. This failure of foresight is also notable on the part of academics.

19. The Environment Agency was hamstrung from the beginning by the emphasis by the then Government in setting it up on devising an administrative structure that would save money rather than one which maximise effectiveness or efficiency. The combination of three functions: all media pollution management; integrated catchment management; and the delivery of a very large capital and operating programme of flood risk and coastal defence have also created management problems for the Agency. These are problems which it might be argued that the Agency has had ever since been struggling to resolve.

20. The illness and early death of Geoff Mance, its founding director of water resources, probably also created some problems for the Agency but the Agency’s response to his illness and to his death was exemplary.

21. The national shortage of water engineers and the problems of staff retention also inhibit the performance of the Agency and ones which they are seeking to address by, for example, sponsoring a Foundation Degree in flood management.

22. Integrated Water Resource Management should be expected to result in the increased adoption of multi-functional solutions; for example, the creation of wetlands to simultaneously tackle water quality problems, provide flood storage, and enhance biodiversity. However, multi-functionality has at present to be delivered through single function budgets. In particular, the only significant capital budget available to the Agency is that for flood and coastal defence. Whilst Defra is currently funding a study on how best to implement multi-functional solutions through the single functional budgets of different stakeholders, it is a pity that the Agency does not have the power to raise some broader “catchment improvement” levy which could be used for such multi-functional schemes. This would probably make it easier for it to work with the other stakeholders in delivering such schemes. Such funds might have been raised through charges for abstractions or discharges.

23. The Environment Agency is finding the transition from what was a scientific bureaucracy to operating within the new context of stakeholder engagement very problematic. Its consultation paper as to how it should engage with the stakeholders under the Water Framework Directive was deeply unconvincing and attracted wide criticism. But, since the Agency lacks either the powers or the funding as the Competent Authority to deliver the Water Framework Directive, success in engaging with the stakeholders is a survival issue for the Agency.

24. The privatisation of the wastewater and water industry left the companies uncertain as to their role and for some years they failed to put forward any convincing vision. As a result they were squeezed between the Environment Agency and OFWAT, who, respectively, took all the credit for environmental improvements and increased efficiencies. The Environment Agency, for example, took the credit for the improvements in the water quality of the tidal Thames which had been paid for by the charge payers of Thames Water and delivered by Thames Water. I argued some years ago that the companies ought to have positioned themselves under the slogan “The environment’s water, your money, our responsibility”, and, that as such they ought to be practically bullet proof. By defining themselves as being there to make profits, rather than to deliver a service for which profits were necessary in order for the service to be viable, they exposed themselves to attack from every direction.

25. Whilst the process of privatisation was a search for a means of privatisation rather than for a means of improving efficiency, the attempt was made to move away from the US model of return on capital as the basis for price setting to a system of price setting that provides incentives for efficiency. But, since water management is capital intensive, issues of price setting ultimately always resolve to questions of the appropriate return on capital. The price structure creates pressures on O & M costs but OFWAT is forced into the position of trying to second guess the companies’ investment needs and cost of capital. At the same time, in each price and quality round, all the other stakeholders, notably the Environment Agency, English Nature and the environment NGOs play a game of poker; when one states a need for the investment of £x billion, the next responds that I’ll see your £x billion and raise it £5 billion. Since the price structure creates an incentive for the companies to invest, they are happy as long as they are allowed to invest in something. Hence, there is a collective enthusiasm for investment in which the consumers’ voice is under-represented. This collective enthusiasm for investment was seen in the PR campaign for the Thames Tideway scheme during the time between the interim and final price determinations in the last price and quality round. The alignment of interests in favour of additional investment and the under-representation of the consumer makes it inevitable that OFWAT has to seek political direction as to the trade-off that should be made between prices and investment.
26. Longer term, it can be questioned whether it makes sense for private industry to tie up increasing amounts
of capital in an industry where growth should be expected to be negative but the demand for quality
improvements to continue to rise. They might achieve better returns on capital by seeking drive up efficiency
gains in operations and investment whilst leaving the capital investment to the consumer. The Welsh Glas
model may be the model of the future.

RESEARCH AND DEVELOPMENT

27. The UK has a very strong R & D base in regard to water management. This includes HR Wallingford;
WDEC at Loughborough University; the different groups at Cranfield University; Ian Calder’s group at
Newcastle University; the development studies groups at Sussex and UEA; PSIRU at Greenwich; David
Butler’s group at Imperial College; WRc; and Tony Allen’s group now at Kings College, London, amongst
others. Both the Environment Agency’s Demand Management Centre and the government’s Envirowise are
key players in demand management and along with some of the groups listed above are world leaders in their
areas. But the quality of UK research is of skewed distribution, as is probably inevitable.

28. Equally, there are potentially significant innovations taking place including the “BedZed” housing
development and the proposed “North Harlow” development. Conversely, there are a number of shibboleths
that are routinely repeated eg water metering as a panacea for demand management and wetlands as a solution
for almost every problem. In practice, water metering provides only a signal and incentive for demand
management, and quite an expensive signal at that. Similarly, wetlands can be emitters of methane, an
aggressive greenhouse gas, and this has to be considered when planning to create or re-create wetlands.

29. In considering R & D, particularly academic research, there are two fundamental questions: firstly, does
advance occur by accretion, evolution or revolution? Secondly, what is the relationship between research and
practice? Answers to these questions are necessary before we can answer the basic question of: what research
strategy will benefit the UK and the wider community.

30. The accretion model perhaps represents Kuhn’s conventional science; it is certainly very comforting for
the academic as it presents no challenges to us as we become more senior. Equally, it makes the decision as to
which research to fund quite straightforward. If however advance occurs through evolution or revolution,
then we should be promoting and funding evolution and revolution, and the inherent conservatism of the
accretion approach can be counter-productive although a degree of conservatism in the form of scepticism is
necessary to distinguish between true and illusory evolutions or revolutions.

31. There remains some highly undesirable conservatism in the form of unreconstructed sexism and other
forms of discrimination in some areas of academic life. I am told that a very senior figure in geomorphology
expresses the view that women are physically incapable of undertaking fieldwork in this field and should never
be allowed to drive. But the women experiencing this prejudice are also aware that the person in question could
destroy their careers if they complain. The peer review process itself must itself be constantly kept under review
to avoid it becoming simply institutionalised prejudice. Merely being an academic does not necessarily make
one a nice person.

32. The conventional conveyor belt model of basic research, strategic applied research and so on down to
consultancy is delightfully self-serving for the academic as we can indulge in blue skies research whilst
simultaneously claiming that eventually someone else will find it useful. I’d claim that there is instead a
virtuous circle between theory and practice in water management. That there is nothing so useful as a good
theory but nothing like confronting practical questions to expose areas where either there is no theory or
existing theory does not survive the reality test.

33. The answers to these two questions also determine the appropriate form of the Research Assessment
Exercise (RAE) since it is to the incentives provided by the RAE that academics very largely respond. In
previous rounds both the Research Councils and the Environment Agency have claimed that the format of the
RAE did not reflect their interests.

34. Two other issues are research productivity and dissemination. We want to produce more high quality
research per pound spent but I can find very little literature on how research should be organised (ie as a
research centre) so as to maximise this ratio. It should be possible to draw lessons from highly successful
groups in the past that can be applied now. This might include training in research leadership or lessons of
research organisation and should not rely either upon outstanding intellectual capacity or personality on the
part of the researchers. We want high quality research from the not necessarily first rate.

35. Academics are both compelled by the RAE and by vanity to publish to each other; the problem is more
one of stopping us producing papers which often contribute little. But there is very little literature on the best
means of turning invention into innovation, of translating theory into practice, of communicating with the
end users. I believe that creating a community of water management would be helpful in this regard but some examination of the effectiveness of alternative approaches to dissemination would be helpful.

36. This absence of a community of research and practice was notable at the 3rd World Water Forum at Kyoto; the Dutch and, to a lesser extent, the French put together impressive combinations of stands and programmes of activities in which government agencies, consultants, the research centres and private industry combined. The formal UK presence was a very small stand by ODI. I have suggested that DTI should look to create a similar UK presence at the 4th World Water Forum in Mexico City in order to help UK exports of goods and services.

**Adaptation and Innovation**

37. The existing stock of buildings is being replaced at a very low rate: notably, housing where the current rate of replacement is 0.1 per cent per annum. This, together with the large sunk investment in the existing wastewater and water systems mean that we will have to deliver sustainable development, at least initially, very largely with the existing stock.

38. This means that retro-fitting to increase the efficiency of water use is key. The Envirowise programme has shown that in industry there is extensive scope for improving the efficiency of the use of water whilst simultaneously increasing profits. There would seem to be a “free-lunch” available in the order of a 15–25 per cent reduction in water usage. This potential free lunch is partly because reducing water consumption can potentially save money four times: in water usage, energy usage (large amounts of water being used for heating or cooling), wastewater treatment, and the recovery of materials entrained in the water.

39. The other message from Envirowise and globally as well is that prices are relatively ineffective in reducing demand and that substantial price rises are required to deliver relatively small reductions in demand.

40. It may be that to deliver sustainable development we will have to return to the levels of house building seen in the immediate post-war period; we need to assess whether an enhanced rate of replacement of our existing stock is more efficient in terms of sustainability than seeking to retro-fit our existing stock.

41. More widely, the critical question is whether the determinants of water usage are primarily behavioural or technological or other. If domestic usage in particular is primarily driven by behavioural factors, then metering might be effective in the long run. If, however, it is primarily determined by technological factors then the emphasis should be on promoting the adoption of the appropriate technologies. I would argue that technology is more important in domestic water usage than behaviour, that the greater water use efficiency in homes in the UK as compared to the USA is significantly the result of technological factors (eg the use of front loading as opposed to top-loading washing machines).

42. In terms of water usage efficiencies, Copenhagen’s target of reducing domestic water usage to 110 litres per person per day looks reasonable. The idea of a “Water Trust” is an interesting suggestion of a means of promoting the replacement of water appliances by more efficient appliances. In particular, it may be suspected that the poor are least likely to have or be able to afford new, water efficient appliances and hence most likely to be disadvantaged by a reliance on water pricing as a means to induce water efficiency.

43. Next, we are likely to be looking to de-couple sanitation from water usage. Simply following the slogan from the last Californian drought “If it is yellow, let it mellow; if its brown, flush it down” could significantly reduce that 30–35 per cent of domestic water usage that is used simply to flush toilets. In multi-occupancy building, water-free urinals are an option. Completely cutting the link between human waste and water usage by shifting to “Eco-San” techniques will be more challenging.

44. Probably beyond that we are looking for the adoption of rainwater harvesting, or local reuse and recycling. Here, real energy costs are critical: to increase water reuse whilst increasing greenhouse gas emission would probably be counter-productive. In addition, there tend to be technological economies of scale in water management.

45. As noted at the beginning, potable water requirements are small compared to the water requirements of food production. In addition, urban areas are efficient forms of rainwater harvesting; in general, we get more water out of a city than we supply to it. Indeed, it is the efficiency of urban areas as rainwater harvesters that is the problem: that most rainfall on a city is efficiently gathered up by the roofs and other impermeable areas, and then rapidly conveyed to the nearest water course by the sewer is what creates the problem. Particularly when in the course of washing the roofs, the pavements and the roads that rainfall becomes polluted.

46. Simultaneously, there are contending pressures for which water efficiency is only one issue. The government quite reasonably wants brownfield sites to be used rather than greenfield sites for new housing, and high densities to be adopted partly in order to reduce land take. It is also emphasising the need to reduce...
August 2005

Memorandum by the East Suffolk Water Abstractors Group

East Suffolk Water Abstractors Group represents the interests of 80 irrigation abstractors in East Suffolk. The group believes that the home production of food from sustainable resources is the most environmentally acceptable. Five thousand five hundred hectares of vegetables are grown in the area. Potatoes, carrots and onions are the major crops, although the variety ranges from melons and strawberries to “mange touts” and swedes. There are also several large nurseries in the area including Messrs. Notcutts who alone employ 300 people. The group’s database shows that the growing of irrigated crops produces in excess of £10 million annually for the local economy from direct and indirect employment. A study being carried out at the University of East Anglia on behalf of the group has shown that, for climatic and other reasons, a proportion of the East Suffolk production could not be substituted elsewhere in the UK. It would, therefore, necessitate importation. The transport required to carry this produce to the nearest UK port would create an extra 5,000 tonnes of Carbon Dioxide Emissions.

The continuity of this industry is dependent upon a reliable water supply for irrigation. This is needed to ensure a return on, not just on the high amount of working capital required, but also the continued investment required on new technology.

This supply is coming under increasing threat in the near future. Firstly, from environmental pressure through the Habitat and Birds directives which protects the estuaries and marshes for wading birds of which East Suffolk has many. Secondly, from climate change which will be managed by the Catchment Abstraction Management Strategy (CAMS) and Section 57 drought orders which can curtail direct summer spray irrigation abstraction. Much of the East Suffolk abstraction is currently direct summer abstraction from rivers or the ground aquifer.

East Suffolk Water Abstractors Group believes that the long term answer for avoiding potential curtailment of abstraction is to construct winter storage reservoirs. These would be filled with surplus water flows from rivers and streams. Climate change predictions are for warmer summers but wetter and milder winters. The reservoirs might be individually owned or more probably co-operative ventures.

The Group is asking for support for this idea. Help will be needed in the form of grant aid for the construction of such reservoirs and related works. Also, in the easing of bureaucratic and planning restrictions to enable the construction of the reservoirs to take place.

Although I have quoted details for East Suffolk, the main principles apply to other areas of the United Kingdom where irrigation takes place. In Suffolk and Norfolk, environmental concerns are the greatest threat to irrigation abstraction. In the South East and central England there is further pressure from public water supply requirements.

September 2005

Elveden Farms Limited

CALL FOR EVIDENCE—WATER MANAGEMENT

Elveden Farms Limited

Elveden Farms is a privately owned rural based business. The present owners have held the property for the past 111 years.

Key statistics of the business are that it:

— owns over 9,500 ha rural land in the county of Suffolk;
— farms 4,000 ha on its own account, predominantly potatoes, onions, carrots and parsnips;
— manages over 1,500 ha. of dry and wetland heath under ESA and other agreements, much of it designated SSSI, ESA or County Wildlife Site;
— manages 2,000 ha of woodland and forest;
— manages over 230 domestic dwelling houses, mostly serviced by private water supply;
— directly employs over 100 people;
— offers recreational and sporting facilities of rural interest; and
— holds water abstraction licences totalling in excess of 2,500 megalitres per annum, mostly for spray irrigation but also for domestic and agricultural use.

Elveden Farms has a strong and vested interest in all aspects of rural landscape management; from intensive commercial food production, to enhancing environmental diversity on rare habitat areas; from providing housing and employment to a stable rural population, to providing recreational and sporting opportunities to residents and visitors.

Access to water is vital for the sustainable future of the land holding. The farming element remains the financial powerhouse and produces over 80,000 tonnes of fresh vegetables per annum. These are all programmed supplies for major UK food supply chains, including all the major multiple retailers and a number of high profile brand processors. The farming system produces high yields of safe, reliable food for Britain’s population. It is a reliable, low-cost producer, close to its markets.

The farming activities help to give the commercial strength and the resource base to look after the large areas of environmentally important landscape and to support an ever growing range of non-agricultural rural interests.

**Comment on Questions Raised**

*Defining the problem*

The collective understanding and knowledge of how Britain’s aquifer and river systems function is inadequate. Although research is being undertaken, I urge the Select Committee to look closely at ways of expanding our knowledge more quickly.

A major factor underlying concern over water supply is that the area of greatest demand (the South and East of England), is also the area of greatest growth in demand, where rainfall is least, where food production is most important and where environmental concerns are least well defined.

I do not believe the work done so far in assessing the magnitude of problems ahead has been in the least bit imaginative. Reports I have seen do little more than suggest we flush the loo less frequently, take fewer baths, don’t wash the car, leave the garden to wither and take water away from food production.

This is not the way forward for an advanced and sophisticated industrial society, it looks backwards not forwards, in comes up with reactions, not solutions.

There is an inference that agriculture can be sacrificed to allow the expansion on the public water supply. This is neither necessary nor desirable and I urge the Committee to look at ways of ensuring the retention of food production as important and legitimate.

*Supply and Demand*

There is the potential to increase the effective usable water supply by a number of methods, including:

— make better use of existing resources by improved infrastructure and more efficient use;
— reach a better understanding of the needs of the environment, it is possible we could reduce the use of the “precautionary principle” and release more water for legitimate commercial use;
— move water from areas of low demand to those of high demand; and
— develop novel sources of water, for example desalination of salt water and stripping water from the atmosphere.

Demand for water at the point of use is most likely to rise. Economic instruments are a favoured method for influencing the behaviour of consumers and others. The planning system could be put to better use, ensuring that new developments, be they industrial, commercial or domestic, take proper account of an adequate supply of water, its efficient use and effective disposal. This could include developing and applying new technologies. Government could offer financial incentives or tax breaks to stimulate take up of new ideas.
There is a huge opportunity for science and technology to help reach new solutions. This could include areas such as:

— lower cost piping and water transfer technology;
— systems for separating water of different qualities at point of use;
— developing novel water sources; and
— developing more efficient water use models for crop production.

*Infrastructure*

There is plenty of evidence that the national public water supply infrastructure is in need of improvement. Some water companies have been less responsive than others in dealing with leakage. There is little incentive for them to invest in storage systems to buffer periods of high demand. At this stage the pressure is there for farmers and others to invest in winter storage, leaving all summer water available for public water supply.

*Context*

I believe the regulatory framework is more than adequate, what we are lacking is sound science on which to base the application of existing regulatory powers. The regulatory framework exists to protect the environment and to ensure efficient use, what does not exist is the science to fully understand the needs of the environment. We can use water efficiently with known technology, we need to push technology forward to give us better tools to work with and move us to a new level.

Government policy appears to be paying much lip service to water, but this has yet to be seen clearly in areas of planning. Housing developments appear to be popping up in areas of restricted water supply with no real evidence of how they are to be serviced in to the future.

Agricultural need is accepted as a legitimate use of the water resource, but government has made it very clear that it does not care whether or not there is any food production in the UK. I believe this to be short-sighted for a number of reasons, not least of which is the broad environmental consequence of allowing food production to migrate further and further away from the point of consumption. If agriculture and food production are denied access to the national water supply, there will be a significant impact on the viability of rural England.

Thank you for giving me the opportunity to comment on this subject. I urge the Committee to look carefully at the role of science and technology to enable us to take proper regard of the environment whilst at the same time developing techniques and systems which allow all legitimate water users, especially agriculture and food production, continued access to this most vital natural resource.

*October 2005*

**Memorandum by Mr Gerry Evans**

**Defining the Problem**

Causes of current water supply problem

In hindsight a “not for profit” water industry emphasising quality and service may have been a preferred choice to privatisation; it may also have rid the industry of the question of profiteering instead of providing a good service. Water is so vital; unlike gas, electricity and telecommunications it can’t be manufactured. Water comes from one natural source—rain. There are no alternatives. There is nothing wrong with the supply; we get plenty of it, it’s what we do with it once it has arrived. Water companies own all water flows and are amongst the greatest polluters of water. Their response is to build more reservoirs to improve the capital ownership and, if allowed, there would be no incentive to reduce leakage. Nationalised Water Boards were amongst the richest publicly owned organisations in the UK with massive assets in land, buildings and equipment in the UK, privatising it was one of the worst cases of asset stripping of any industry with land, buildings and equipment sold off benefiting shareholders. It was; I understand the Chairman of one water company said at the time of privatisation “I have an abundance of customers but a limited number of investors”. This is not the message the public wished to hear.

Employees with years of hands-on engineering experience and skills were either made redundant or retired off to reduce the salary payment bill, there are virtually no skilled people in the industry these days. Lack of maintenance of the infrastructure is the main problem due to the overwhelming desire for increased profits. We now have a patch and repair water system that still lacks the proper investment. Had it been made into a
“not for profit” organisation with proper equipment and a skilled workforce the whole system could have been completely renewed by now. The gas industry had natural gas making millions of pounds worth of profit for them to invest in new pipe work but is our water and sewage any less important? We can’t live without water. Twenty years ago it was stated that the infrastructure was so poor that we were losing 25 per cent of the water due to leakage; there has been a 400 per cent increase in water charges and no reduction in leakage. Had the nationalised water industry stated that to improve our water supply system it would be necessary to increase water charges by over 400 per cent there would have been an enormous political outcry about the waste of money. We are in a worse situation than we were then because we don’t have the skills available in the industry to correct it. On top of that the Government still subsidise water companies and we no longer have the capital to invest. But shareholders’ dividends and directors’ salaries and bonuses increase in spite of this.

How can government or OFWAT rely on information without accurate accounting and leakage figures? Those that have the information are unlikely to want to lose their grip on the industry by divulging it to others without a legal fight. This Government and OFWAT have proved they have no idea what the situation is by threatening to take legal action. It took the bravery of a whistleblower in Severn Trent to illustrate what was going on in the industry, that accounts and leakage figures were bogus. The Government and OFWAT should have been aware of this, possibly were, but didn’t want to admit it.

Maintenance contractors have no interest in the job apart from getting it done as quickly as possible and make as much profit as possible, and who can blame them? I am informed that in many cases the water company does not directly employ contractors where the work is taking place. They farm it out to another water company who then employs a contractor to do the maintenance work for them. This means that the contractor submits his invoice to one water company who then gets his slice of the cake by putting on a handling charge to the original water company who, in turn, then puts on another handling charge before putting it into their accounts as “maintenance”. Does this mean the public ends up paying 30–40 per cent higher than if their own water company had handled the contract originally? Is it just another way to increase profits by circulating money? Surely, if management cannot handle its own contracts they are not fit to do the job for which they have been appointed? It appears the same system is being used for meter reading. Doesn’t it seem strange that a water company makes a case for water metering but is so incompetent that it can’t organise its own meter reading without going through two or three sub-contract companies? Has government or OFWAT investigated these potential scams? If it is a scam why don’t they stop it?

Water companies have been cushioned and protected by government and OFWAT far too long with subsidies and allowing them the privilege of not matching up to European water quality standards. EU standards should be met if they are higher than ours and subsidies stopped. No increase in water rates to make up the difference water companies must invest more, even if it does affect share values. Above all accurate accounting is essential with stringent penalties if not given.

**Projections for future water supply**

Projections are not good for the future if incorrect information is given especially if OFWAT’s regulation is as poor as it has been in the past and government ministers remain uninformed. It comes down to honesty on the part of water companies. Projections can only be based on fact, if no one has the facts how can anyone project anything? Legislation is there, why isn’t it being administered fully by OFWAT making them carry out their public responsibilities. Directors should face serious penalties including heavy personal fines. Shareholders should be hit so severely they will insist their directors do the job they are supposed to do. The Water Act should be imposed in the public good. We don’t know if the whole system is going to collapse tomorrow, next week or in 10 years’ time without the facts.

Water companies should face financial penalties and be made to reduce leakage by having a plan to renew the whole system over the next 10 to 15 years. It should include all valves etc, filtration, mains pipes, meters and services from reservoir to consumer—they said they could do a better job than the nationalised industry, let them prove it, there is little sign of it so far, they have only sidestepped their responsibilities. They should be made to present a plan within six months on how they intend to achieve this goal and not expect any increase in water rates. The cost of water has increased enough over the last 20 years with comparatively little in the infrastructure. They have invested money that should have gone into the infrastructure into other ventures such as hotels, waste companies and meter manufacturing.

Water companies have had the impertinence to start plumbing and central heating companies when they can’t look after their own distribution systems correctly and stop the leaks. It’s not good PR for a plumbing company if you have 25 per cent leakage on your own system. Their ambition is to have all plumbers registered with them before being allowed to practise in the same way as the gas industry does with gas fitters. This is nonsense because there isn’t the same danger as with gas. They are only interested in adding another perk to
their income by charging a subscription fee of hundreds of pounds per year for each plumber and overcharge customers for a service carried out by these plumbers. This should be stopped; plumbers should only require British Institute of Plumbers certification before practising. Water companies should have no jurisdiction in this field.

OOFWAT regulators in the past have been extremely lax; they threaten and blow hard but act more like a PR office for the water companies. We will have to wait and see if the present regulator is prepared to carry out his recent threats to prosecute the water companies if they continue to give falsified figures. The fact that he has said they are giving falsified figures makes it impossible to see how anything can be projected until the water companies are stopped in this practice.

The Government can be misled by technicalities of the water industry and should broaden their consultation to take independent advice. If there is a crisis with any particular water company, they will make a lot of noise for a few weeks but then nothing appears to happen. The water company in question will be reprimanded and then it will all be forgotten. If a drought occurs politicians would be queuing up to get on television to talk and pontificate until such time as it starts to rain and then forget it. If pushed they will just give way to the water companies and have more reservoirs and at the same time try to convince (but not succeed) the public there is no alternative. Until present leakage is reduced to 1 per cent or 2 per cent and the public have positive proof of this, no new reservoirs should be built.

Since 1945 the UK population has grown by 50 per cent, we live on a small island and the infrastructure and resources are being stretched to the limit. We are drinking at least 50 per cent more water and creating 50 per cent more sewage but the physical size of the country hasn’t changed. Planning authorities allow houses to be built on either green sites, flood plains or highly polluted land at a growing rate that are badly planned with inadequate sewage and water systems.

Water companies should not be allowed to disclaim responsibility for smaller size sewer pipes. When the industry was nationalised there was no discrepancy, all sewage pipes were under the control of water boards. Privatised water companies should not be allowed to pick and choose the bits they can make most profit from and then leave the other for the public to solve. This sort of deception is what concerns the public and they feel let down. Water companies said they would do a better job when it was privatised; in fact, they only wanted the bits where they could make a profit—the land and buildings etc to sell off. Government and OFWAT should make sure they carry out their public responsibilities. The industry has been milked dry for the sake of increased profits; nobody is clear about what state the infrastructure is in. Government ministers and OFWAT have stood by and in spite of numerous warnings have done nothing to stop it. Appeasement doesn’t work with water companies.

We cram more and more people into the South East corner of the UK knowing full well that the resources are not there. The quality of water in many parts is so full of chemicals it is said to be affecting the people’s health and reportedly the virility of some. Estates all over the country are built on polluted land and if there is a drop in pressure in the mains some of this polluted material in the form of chemicals could be drawn into the water supply should there be a leak. The public have no idea what harm these chemicals will do. There should be higher national planning standards and higher minimum standards of our water and sewage services. Shareholders should take second place they have had their chance and water and sewage is far too vital for the country for them to be trusted with the responsibility of us getting a good service. Water companies should be forced by law to give accurate figures in their accounts and leakage figures so that clear projections can be made, otherwise it’s guesswork. How government can do this without taking over control it is difficult to say.

Research, predictions and future scenarios

Predicting and trying to handle future scenarios is pointless. We don’t even know what the true situation is at present—so how can you predict the future? To predict you have to have a starting point and you have nothing to base it on. The only way that you are going to be able to predict anything is to make sure that OFWAT and government have irrefutable evidence of the water available, water used and water lost due to leakage. There is only one way that this can be done as far as I can see and that is to have a meter directory of every meter on the system. In that directory would be the number of the meter, size of main, location of the meter, date of installation, date of last reading and who read it and the information could be kept by OFWAT as well as the water companies on their computer. Information would be given to OFWAT every week on the meters read. There would be no access to the OFWAT computer by the water companies, which would prevent any accusation of massaging the figures.

Something along these lines must be done to get control back, everyone else is in the dark at the moment, the only ones with any idea are the water companies and they obviously cannot be trusted. If someone has a better idea let’s hear it. The public’s health could be at stake and that is far more important than shareholders’ profits.
Our aim should be to completely renew all distribution networks over 10 years old throughout the UK in the same way as the gas industry did when natural gas was discovered. That way we will know that the water distribution system is in good order. Work should be carried out to gas leak standards or higher and all contractors’ work inspected properly before final re-instatement. Top quality recording equipment (meters) with good low cost maintenance systems incorporated into the system to ensure that accuracy is maintained. It doesn’t mean that only large foreign owned corporations will have the answers to these problems they don’t, UK companies should be allowed to put their ideas forward.

Good quality accurate metering is essential, reducing leakage to 2 per cent or below, which is possible if the job is done correctly and accurate accounting will give those responsible a basis on which to predict the future requirements.

Although some measures may have been taken to reduce domestic meter failure rates during installation they still occur and there is not one water company that could give accurate information on meters running slow. However, if a domestic meter is running slow by about 8 per cent and the average total water and sewage bill is £400 this is a loss of £32 per annum. If 20 per cent of the 5 million meters installed are running slow this could amount to £32 million per annum. As can be seen by the report written by Schlumberger Meters in 1994 any particle over 100 micron can affect the accuracy of the meter. A meter running slow is a failed meter, it also gives inaccurate information to the regulator. Water companies should be made to produce evidence that they have done everything in their power to ensure that meters are not only accurate but at the lowest cost possible, which they are not at present.

The UK water industry has a duty to the UK public to give accurate information. Government and OFWAT need to show some backbone and demand that directors are heavily penalised if they don’t put their country before shareholders. They must guarantee a first class system both in water and sewage treatment. Which comes first the public health or profits?

Response of government, regulator, EU and industry

The response of all the above has not been very encouraging. Politicians cannot possibly know the ins and outs of the industry in the same way as those who run it. Having lost control of it 20 years ago we have to make up lost ground. Politicians should have expected this to happen when there is money to be made with virtually no restrictions on those who were controlling the purse strings. It has been one of the worst cases of asset stripping in the history of this country. Had it been a “not for profit” organisation from the start any profit made would then have been ploughed back into the industry; we could have had a first class system by now. It’s not too late to do this.

EU can’t be blamed in any way because they could only operate on information given to them originating from water companies, OFWAT, and UK government. Water companies gave false information to OFWAT and government; it’s not possible to blame the EU. It is the UK who refused to meet European water quality standards by unwisely listening to the officials in the water companies.

Government must demand that water companies give the correct information and employ enough experienced engineers and “honest accountants” to double check that they are giving the correct information and encourage more “in confidence” whistle blowing from within the industry. Government must demonstrate that they do mean business by heavily fining. It is then and only then that the message will sink in. If they don’t comply with the rules the industry should be turned into a “not for profit” organisation without compensation to the shareholders. Shareholders should make sure that directors face up to their responsibility to the public—if they don’t they shouldn’t complain if they lose their shares.

Government ministers, water companies and OFWAT regulator were informed in the 1990s that a deception was taking place concerning domestic metering and didn’t act to stop it and it is still taking place today. Government ministers have continually played “pass the parcel” with any letters of complaint they receive to avoid giving a proper constructive reply. This deception has been going on since privatisation. It has cost the country millions of pounds and not one of the domestic meters installed can be claimed as “fit for purpose”. The evidence is available should any member of the Committee wish to contact the undersigned. How can anyone expect correct information from equipment that has a deliberate flaw designed into it to cause failure or under registration?

Another issue that should be investigated is the relationship between government and water companies? Water companies, I am informed, spend a considerable amount of money lobbying government—why? Water companies are monopoly organisations. Why is this money that comes from the British public via their water rates, used for lobbying MPs, who benefits? I am sure the public cannot possibly benefit from it, there is no justifiable reason for it, if true it should be stopped.
SUPPLY AND DEMAND

Increased water options

Obviously the greatest option for increasing the water supply is to reduce leakage with greater investment in replacement of the whole system over 10 years old from the reservoirs to customer. This would entail the renewal or refurbishment of valves, distribution mains water meters and domestic meters. Every consumer should be metered; the meters must (by law) be physically read regularly every six to 12 months and stringent penalties for those water companies who do not comply. They should verify the meter has been read with OFWAT in a manner that OFWAT can easily check. Independent checks should be done by OFWAT in different areas. Customers should be able to complain if their meter has not been read for 12 months and the water company should be penalised by only being allowed to claim for six months’ water if it is proved they have not read the meter for more than 12 months.

The reason why your gas and electricity meters are read more regularly is because they are dealing with a manufactured product. There are no production costs with water, the commodity is manufactured and supplied free of charge. Water companies don’t care if sales figures don’t match delivery notes, they just hang around for a few weeks for the next delivery, if it’s late—it doesn’t matter, as customers can’t change supplier. If we imported or produced water, attitudes would soon change, meters would be read every quarter like the electricity meters.

Meters on the system should be maintained on a regular five or 10 year basis and be so accurate that only a 1 per cent–2 per cent tolerance would be allowed for leakage between reservoir and consumer. It should be made clear to water companies that the figures must not be massaged so that a greater loss on one section could be set against a lower leakage rate in another section to provide the required leakage figures overall. OFWAT could check their figures to ensure accuracy. Readings should be sacrosanct, what is on the meter is what you pay. Any manipulation of leakage figures, for whatever reason, should carry a mandatory fine for the water company and the directors of that company with greater punishment including fines or imprisonment if it occurs twice.

It has been proved that not one of the mechanical domestic meters installed has been “fit for purpose” as required in British Standard BS 0 “A Standard for Standards”. Meters have been tested to one specification using very fine filters but sold with a different size filter specification guaranteeing many failures and inaccurate information. Water companies, meter manufacturers, OFWAT, BSI and government ministers were warned of the double standards being used for testing and selling meters but ignored all warnings.

BSI could not be persuaded to either alter the BS5728 (now BS-EN 14154-1-2-3) Standard or investigate the allegations in spite of the irrefutable evidence placed before them. BSI has been questioned about the quality of their Standards they were being questioned as long ago as 1993 by others.

Government ministers and OFWAT regulator were informed and failed to investigate the complaint. After 5 million mechanical meters had been installed that are not “fit for purpose” it may be a suitable time for ministers and OFWAT to be asked why they allowed it to carry on? How do we know how many are stopped or running slow if the testing of the design when on the test rigs are faulty and if there is only an obligation to read them every two years?

Water companies claim that the public does not suffer if the meters run slow or stop because the public don’t pay for the loss of water. That is incorrect. Water companies are not listed as charities in the Yellow Pages they are there for one purpose, to make profit. If water revenue is lost due to meters running slow or stopped they will make up those losses in other ways such as leakage. If meters fail it costs money to replace them (labour, vehicles, administration, new meter etc) and that is also charged to the customer. I have witnessed skip loads of domestic meters with less than a cubic metre of water registered. How many sub-standard domestic meters have been purchased since privatisation to attain the 5 million presently installed? OFWAT should investigate how many meter failures there have been since privatisation. No one can tell if a meter is running slow by looking at it—there has to be an investigation and that costs money for labour, vehicles etc and there could be thousands running slow.

BSI claim that meter failures are the responsibility of either Weights and Measures or Trading Standards—not true. Weights and Measures are only involved in testing meters on the test rig at the manufacturer’s premises, what happens to them after that is not their responsibility. Trading Standards did not write the BS Standard and Trading Standards have no authority over BSI to tell them how or what should be included in that Standard. They would have to rely on the expertise of others. Trading Standards could only act if the water companies complained and the water companies did not—for reasons that suited them. My reason for explaining this to the Committee is that without accurate and efficient equipment to record the use of water we don’t know what we require.
The idea of using up more land for reservoirs should be the last resort, if 25 per cent of the present water is being wasted it illustrates that extra reservoirs are not necessary at the moment. What in terms of waste does 25 per cent leakage amount to, is it five, 10 or more reservoirs? Our land is too precious to be handed over to water companies for this purpose. Fix leakage first, reservoirs can be considered as a last resort.

Future trends in water demand

We have had a population growth of nearly 50 per cent in the last 60 years and with the barriers coming down across Europe it is likely to increase the strain on our infrastructure to breaking point unless something is done very quickly. We should not only look at water supply but also at the sewage system and many other things, which will also be under an equal amount of stress especially in the South East.

Water metering of the whole system with good quality equipment that is easily maintained, from the reservoir right through to the end user is essential. We need accurate figures to predict future trends. The equipment used must ensure that the quality of water delivered to the customer (who pays for this service) is of the highest quality. Every aspect of any new equipment to be used must be examined. For example electro magnetic meters should be used only when they can give the same assurance on accuracy, flexibility, engineering durability and quality of water supply as the best designed low cost, low maintenance mechanical meters could do. A good mechanical domestic meter will record leaks as small as one litre per hour. The electro magnetic meter has to have 7.5 litres running through before it starts to record. So it would be able to leave a hose trickling all night at six litres per hour and pay nothing for it.

Demand for water will inevitably grow therefore metering the whole country would make a huge difference to the knowledge we have if properly handled. Meters could also be used to inspect and analyse the particulate matter passing through our water, a very essential service especially where estates are being built on toxic land. This type of service is essential to enhance the quality of our water supply and safety of the nation.

Product warranty must have a meaning on all equipment, if something is marked with either a BS or EU Standard mark that Standard must have a value. This is not always the case especially with domestic meters. Increased water supply and metering go hand in hand, using more meters to detect the percentage of leakage in any one section of the system will enable the water companies to find where leakage is most prevalent.

Contribution of science, engineering and technology

Sufficient technology is already available and many people would say the quality of water was better years ago than it is today. The Romans had piped water, sewage and central heating systems nearly 2,000 years ago, basic principles of delivering water haven’t changed for 150 years, and it’s not rocket science as you would be led to believe. There are three main sources from which we obtain water: reservoirs, boreholes and rivers. If you have a reservoir in hilly areas water runs downhill virtually all the way. If it is taken from boreholes or rivers it is pumped around, water companies use a combination of both methods where possible. It is then filtered, purified and pumped to customers. Water companies must be made to meet EU standards or higher if possible. They must not dodge their responsibilities.

A government with similar sort of enthusiasm as the Victorians has to inform the public that all the infrastructure has to be replaced and they will have to pay for it one way or the other. But strict control should be kept on water companies. Nationalised Water Boards failed due to lack of investment and now privatised water industry has failed us for the same reason or because money was “diverted. There is no point the privatised water companies saying the problems are different than in Victorian times because we have larger congested areas. The distribution system didn’t suddenly grow there within 24 hours of the industry being privatised. It was there before and water companies knew exactly what they were taking on because they were already in charge of it. We cannot allow the situation to decline until it is in such a poor state that a serious catastrophe occurs.

In my 15 years’ experience in metering, I have seen that not all high technology is good. Now retired but with 25 years of experience in the industry, my views are independent. Computers and high tech products are very useful in some situations they are not always the answer. One such high tech area that requires the Committee’s close examination is the electro magnetic and electronic domestic meters. Having lost their mechanical meter market due to competition multi national manufacturers are trying to impose upon the public more expensive so-called high technology metering, which is less efficient to get the market back. These designs do not stand up to close scrutiny, which is something I recommend the Committee should do. Questions that should be asked about them are as follows:

— Do microwaves affect them?
— Are they as efficient as class “D” mechanical meters?
— What is the lowest flow they will register?
— Have they been known to register without any water going through them?
— Do they allow more of the particulate matter to go through them than the conventional mechanical meters?
— Is it true there is no filter incorporated into their design?
— If more particulate matter gets through the meters can that grit etc damage ceramic washers, heating systems such as pumps and also block anti-backsyphonage devices such as double check valves causing problems for the household?

Should any member of the Committee have any doubt that particulate matter comes through their water supply it is suggested they look in their header tanks in their loft. Present mechanical meters do stop a limited amount of debris coming through but this can be improved to the point that nothing over 100 microns gets through, which would be a great improvement.

Metering, metering, metering, good quality accurate meters from the source of the water to the end user every step of the way and domestic metering will ensure that the public will take more care. Replacing all mains over 10 years old and going through the whole system from beginning to end including valves, filtration systems, pumps, chlorination plants etc. Everyone should be metered without exception and water companies should be legally bound to read the meters at least every 12 months and fined if they don’t.

INFRASTRUCTURE

Current state of water supply and drainage infrastructure

Leakage is estimated at 25 per cent therefore the state of the infrastructure speaks for itself. Investigate whether enough investment has been made, check gross income against investments into the infrastructure. How much investment has been made into their other ventures compared with what has been invested in the infrastructure? Add government subsidies and see where that money has gone.

OFWAT should investigate the letting of contracts, finding out those who actually carried out the work also the real value of the contract price supplied by the contractor who carried out the work against the actual price charged to the company. Checking to see how many sub-contract companies the work has passed through before finally being entered into the accounts as “maintenance”. Who owned those sub-contract companies (whether they were owned by the water company just to increase profits) and the real price the customer should have paid had it not gone through these sub-contract companies? This practice should be stopped if there is no good reason for it. If the management of a water company cannot manage its own maintenance contracts “are they qualified to do their job”? Again they said, prior to privatisation “they would do a better job and be more economical on cost” but if the contract has to pass through two or three contracting agents in different parts of the country just for someone to nominate a contractor that is already working in the vicinity of the water company who first let the contract it doesn’t make sense. Why couldn’t the original water company have asked for a quote from that contractor in the first place? How does this help the infrastructure?

A few years ago one water company used water tankers to transport water from various parts of the country to customers in their area for weeks at enormous cost but still managed to have record profits for that year—doesn’t that sort of thing ever register with government officials that something is wrong somewhere? If a company in another industry in the commercial world facing stiff competition had acted in this manner they would have gone into liquidation. In the water industry no matter how badly things are handled year on year they come up with record profits. There isn’t any competition in the water industry and there never will be—nor should there be. It is not a commodity that should be considered in the same way as selling petrol or cooking oil. Water is indispensable, no one can live without it and we can’t allow the water industry to act in an irresponsible way. The Government has to crack down on them.

Water Act 2003. National and European levels of investment

The Water Regulations come within the Water Act and should be updated to ensure that the public in domestic properties are “encouraged”, not penalised, to take steps to prevent any contamination coming from their property into the water mains supply. The householder should not be criminally liable, as they are under the new Water Regulations, if:

(a) they did not have the expertise or knowledge to prevent backsyphonage from their property or knowledge of its existence.
(b) A water company had fitted a meter box within the last 20 years without a double check valve (anti-backsyphonage device) system.

c) the anti-backsyphonage device purchased for internal domestic use is sold without clear instructions that inform the public, plumber, installer and householder how often the device should be maintained. To what standard it should be tested before being installed or re-installed during any maintenance work. Also advise the householder that should a double check valve or any anti-backsyphonage device be removed, the manufacturers will advise them how they can test it themselves to the required standard before re-installing it.

Instead the:

1. water companies should ensure that all meter boxes incorporate a double check valve system prior to installation not a single check valve system as presently used. The single check valve in present meter boxes is not incorporated in the meter box as protection against back syphonage; its function is to prevent a rush of water back from the property into the meter box when the meter is removed for replacement purposes. Single check valves do not meet the statutory requirement to give backsyphonage protection.

2. water companies should protect our water supplies wherever possible. Government and OFWAT should ensure they face up to their responsibilities by legislating that double check valves are an integral part of the meter box. Water companies are the experts in this field, they know the standards required, they are the only ones with the equipment to maintain the system to the required standard and should not be allowed to dodge their responsibilities.

The government Water Regulations Advisory Committee (WRAC) consulted me when writing the Water Supply (Water Fittings) Regulations 1999. In the previous Water Byelaws it was stated that double check valves should be “maintained regularly”. When asked what was “regularly” no one knew. Water Byelaws also stated that they should be “maintained to BS6282 standard” which is a very complex procedure. One test is the method used to check the backflow soundness of a double check valve. The instructions were as follows:

(a) Fit onto the outlet side of the double check valve a tube one metre high.
(b) It should be filled with water until a meniscus appeared on the top of the tube.
(c) That meniscus should remain and not disappear for five minutes.
(d) If the meniscus remains it has passed the test.

When asked, no one in the industry knew how to do the test and apparently the only place in the UK that has the equipment to do these tests is WRC research station in Swindon.

So the situation was:

1. Everyone who had a double check valve in his or her property had to “maintain it regularly” but no one knew what “regularly” meant.
2. It had to be maintained to a standard that no one could achieve.
3. They couldn’t achieve it because equipment was not available to them.

The Committee did not include the term “maintained regularly” in the new Water Regulations but held the public responsible for protecting the mains. Water Regulations were upgraded to “criminal law” status. It is the first time in the history of this country, as far as I am aware, that a British government has knowingly allowed a criminal law to be passed with which no one can comply.

I have written to the Prime Minister and the Lord Chancellor questioning whether this was legal but did not receive a reply.

I pointed out to the committee governing the Water Regulations that the public had no idea how to maintain anti-backsyphonage devices or access to the facilities to maintain them. No instructions were issued describing the maintenance methods of such devices by the manufacturer. I believe the law was passed with the intention of protecting water companies from prosecution. It is unjust to knowingly impose something on the public they are incapable of doing.

Water companies knew that without this law they could be held responsible for the backsyphonage of contaminated water from the domestic property into the mains supply. Water companies should be legally bound, they are the professionals with the knowledge to prevent contaminated water being delivered to a householder or getting into the mains. They also say they would never take anyone to court if the law were broken, so what is the point of the law in the first place? How long did it take and cost to set up Water Regulations (a criminal law) heavily reliant on double check valves as part of backsyphonage protection, that they have no intention of applying?
Particulate matter from the water mains can easily jam anti-backsyphonage devices, especially double check valves, in the open position. In the USA backsyphonage protection (in many States) is the responsibility of the water companies. It should be the same in the UK.

If my neighbour has a problem with his plumbing and contaminates the water supply and I become ill I wouldn’t sue my neighbour I sue the water company. The water company have a duty to supply me with good clean potable water, if they allow contaminated water from my neighbour’s service pipe into their mains via their stop cock or meter box I would blame the water company. They knew it could happen and they are the experts.

Backsyphonage can occur even if a house is fitted with an anti-bacsyphonage device. If the buried service pipe goes through a garden with contaminated soil eg an old gasworks site and develops a leak, if the water doesn’t come to the surface it could form a reservoir by the leak. If a fire engine is called to that area it could draw the water back into the main via the leak.

How often have we seen reports on television and radio of people on housing estates being warned not to eat vegetables from their garden because of contaminated soil? My warnings to OFWAT and government about this kind of situation in the past have been totally ignored but frequently people do complain of the horrible taste of their water supply on estates that have been built on contaminated land and also in other situations.

_**How does water figure in government planning?**_

The government is very lax; it has submitted increasing amounts of green belt land to building in spite of its promise to protect it. Inadequate sewage and water systems, poor design and little planning or thought for the future. Building on contaminated soil areas can be hazardous for reasons that have been explained.

_**What can the UK learn from other countries?**_

It all depends with which countries you are comparing the UK. We shouldn’t have to learn from anyone. We were the leaders at one time in this field. It has only been a lack of proper investment into the infrastructure, bad planning by the previous nationalised industry and water companies that prevented us from having the best water and sewage system in the world. Water companies are not going to invest any more than the bare minimum unless legally forced to do it and there is no evidence of that happening.

There was a waste of money in the nationalised water industry but the waste of money by the privatised industry has been just as great.

With the foreign buyers lining up to take over our valuable industry for its rich pickings at the expense of the British public it has been one of the most disgraceful episodes in our history. We ought to be ashamed of ourselves for allowing it to happen and governments of both colours should be ashamed of themselves for the part they have played at the expense of the British public. After 20 years of privatisation, we have water companies who falsify figures, a weak regulator with no control and a government that has no information. Privatisation has failed, politicians have continuously failed us and it is time for them to rectify the situation otherwise there will be a major disaster and they will be to blame.

A number of appendices were submitted with this memorandum. They are available to view on request.

_**January 2006**_

**Memorandum by Ken Livingstone, Mayor of London**

**INTRODUCTION**

1. One of the principal purposes of the Greater London Authority (GLA), as laid down in the GLA Act, is promoting the improvement of London’s environment. The Mayor of London is specifically required to prepare four environmental strategies, and in doing so to have regard to their effects on the health of Londoners as well as the achievement of sustainable development in the United Kingdom. He is also required to prepare a State of the Environment Report.

2. Although the Mayor is required to report on water quality and emissions to water as well as on groundwater levels in his State of the Environment Report, he is not required by the GLA Act to prepare a water strategy. Nevertheless, water is the subject of growing concerns such as the adequacy of water resources to meet the needs of London’s growing population at a time when there is the prospect of diminishing water resources as a result of climate change. There are also as more immediate problems such as the overflow from the sewer system into the River Thames.
3. Water impinges directly on the Mayor’s statutory responsibilities. Adequate and pure water supplies are essential to the health of all Londoners. Adequate resources are essential to accommodate the growth in population forecast in the London Plan. Flooding, and particularly of sewers, is a health hazard. Good quality water in lakes, canals, rivers and streams is essential to the maintenance of London’s biodiversity. Flood prevention and protection against rising levels of ground water impose significant costs on the London economy.

DEFINING THE PROBLEM

What are the causes of the current problems of water supply, and how serious are they?

4. The Mayor of London recognises that London has seen below average rainfall consecutively between November 2004 and August 2005. Yet Sutton and East Surrey is the only water company in London that has enforced a restriction on the use of garden hosepipes and sprinklers over the summer of 2005.

5. The current situation highlights the more underlying problem regarding water supply. In June 1999 the Environment Agency reported to Ministers that Thames Water had a “significant gap between supply and demand, driven largely by the position in London”1. And again in July 2004, the Environment Agency reported to Ministers that “Thames Water has a significant deficit in London”2.

6. The Mayor’s view is that the reason for the continued gap between supply and demand in London is two-fold:
   — The financial regime fails to enable Thames Water to secure an adequate public water supply.
   — The Government’s “twin track” approach (see below) is failing in London.

7. The Mayor agrees with the view of the Secretary of State for Environment, Food and Rural Affairs that “price limits should be as high as they must be and no higher than they need be.”3 As such, the financial regime should both push water companies in the delivery of their business as well as pull back on excessive expenditure. Yet in the Mayor’s opinion the financial regime appears more intent in curbing expenditure than pushing for a secure public water supply in London. The latest price determination has seen cuts in water companies’ proposed leakage and water conservation programmes, regardless of the gap between supply and demand. The financial regime should enable sustainable water supplies for London.

8. Likewise in its recent Ministerial Guidance4 to the water industry, the Government predicated its approach to the management of water resources on the “twin track” approach of managing demand and developing sustainable resources where needed; ie as more resource development is required, increasing effort must be applied to the efficient use of water (including reducing leakage and helping customers to reduce their demands). Yet London has seen a rise in leakage since 2000, with some water companies continually failing their mandatory leakage targets. At the same time, the current and projected level of household water metering in London is amongst the lowest in the England; leaving little incentive to become more water efficient. As a result London is faced with unsustainable resource developments to close the gap between water supplies and the demand for water. These points are reiterated throughout this response.

What are the projections for future water supply, and what factors will influence these projections? Where, and over what timescales, may problems emerge?

9. No Comment.

Is sufficient research being devoted to predicting, and handling, possible future scenarios?

10. No comment.

Is the response of Government, the EU, regulators and the industry adequate?

11. No comment.

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1 Environment Agency, Planning public water supplies (June, 1999).
3 Department for Environment, Food and Rural Affairs, Principal guidance from the Secretary of State to the Director General of Water Services: 2004 periodic review of water price limits (March, 2004).
4 Department for Environment, Food and Rural Affairs, Principal guidance from the Secretary of State to the Director General of Water Services: 2004 periodic review of water price limits (March, 2004).
SUPPLY AND DEMAND

What are the options for increasing water supply, and what are the arguments for and against?

12. It is not for the Mayor to generate options for increasing water supplies. Nevertheless, the Mayor believes that water companies’ drought plans highlight appropriate interim measures to deal with drought events. As far as long-term increasing in water supplies, the Mayor believes that water resource planning horizons are sufficiently adequate to introduce appropriate long-term measures to secure public water supplies, without having recall to unsustainable fixes.

What are the likely future trends in water demand, and what can be done to manage demand more effectively, and to influence the behaviour of consumers and others?


What contribution can science, engineering and technology make towards reducing water use or waste by households, businesses and the public sector?

14. Water efficient technology is available. Yet, the Mayor’s view is that more effort is required in ensuring this technology is both widely promoted and correctly installed.

15. Thames Water’s work on recycling and reuse (in particular its “Watercycle” project at the Millennium Dome) provides useful insight to problems faced with making water efficient products work.

INFRASTRUCTURE

What is the current state of the water supply and drainage infrastructure? Is there sufficient investment in its improvement?

16. In London, more than half of the water mains are over 100 years old, and a third more than 150 years old. In 2004, Thames Water finalised its plan for the water supply network. This plan was predicated on the company’s previously approved assessment of its economic level of leakage. Yet Thames Water was funded through its final price determination to replace fewer miles of mains than initially proposed. In addition, the company is only expected to bring leakage down to its economic level of leakage at the time of the 2014 periodic review. Further, at the current replacement rate, it will take at least 35 years to renew the pipes that are already 100 years old.

CONTEXT

The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at national and European levels, adequate?

17. It is too early to say whether the Water Act 2003 will bring about its desired outcomes, as this legislation is yet to be fully implemented.

How does water figure in the development of Government policy in areas such as housing, land use planning and industry?

18. No comment.

What can the UK learn from the experience of other countries?

19. Nearly 45 per cent of the water mains in Hong Kong were laid some 30 years ago. In discharging its duties to plan and manage Hong Kong’s water resources, the Water Supplies Department (WSD) of the Hong Kong Special Administrative Region Government developed an Asset Management Plan for the water supply network. This plan took into account the capital cost of replacement and rehabilitation works, savings in maintenance costs, the loss of water and the social implications of leakages and main bursts. In line with its

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1 Thames Water, Water recycling and reuse (August 2002).
plan, WSD recently launched a comprehensive and systemic programme to replace or rehabilitate all of Hong Kong’s 30-year-old water mains over the next 15 years.6

October 2005

Memorandum by The Inland Waterways Association

The Inland Waterways Association (IWA) is a registered charity, founded in 1946, which advocates the conservation, use, maintenance, restoration and development of the inland waterways for public benefit. IWA has over 17,000 members whose interests include boating, towing path walking, industrial archaeology, nature conservation and many other activities associated with the inland waterways. Information provided by 188 corporate members with their own membership structures has revealed that they, in themselves, have a combined membership of at least 59,629 in support of IWA’s voice. And there are a further 82 corporate members for which data has yet to be researched. The Association really does, therefore, represent the interests of a large number of people.

IWA offers the following evidence relating to water management and suggests that the following two publications may also be relevant:


What are the causes of the current problems of water supply, and how serious are they?

IWA asserts that navigation is not currently a cause of water supply problems. Navigations transport rather than consume water and obtain a significant amount of their water from surrounding sources of groundwater. Moreover, a sufficient amount of water is important not only for navigation but also for many other forms of recreation, on which the local economy often depends, and also to maintain a good ecological potential and a good chemical status, as required by the Water Framework Directive itself. Therefore, water supplies to navigations should be maintained and steps should be taken to prevent pollutants entering groundwater. Water supplies should also be maintained in waterways to avoid a threat to flora and fauna.

Navigation can counter transpiration water loss. As long as there is no undue growth in the water margins the loss is not great and can be reckoned as part of general evaporation. Where boat traffic does not keep weed growth in check, as in unnavigable feeders, serious loss of water may occur when the weeds are not cleared.

Perhaps the main issue relating to water quality is the discharge of treated effluent (containing nitrates and phosphates) into waterways leading to eutrophication, weed growth and siltation. The Broads is an extreme example but the problems occur elsewhere (example Kentish Stour). The AMP programme has made gradual improvements with steady investment in STWs. But phosphate-stripping is still the exception (applied to SSSIs and other specific waterways) rather than the rule. It is likely that the Water Framework Directive will drive further investment leading to further improvement in water quality and we welcome this.

Is the response of Government, the EU, regulators and the industry adequate?

IWA believes that the response of the Government is, for the most part, adequate. Nearly all abstraction must now be licensed and managed by means of CAMS, the vehicle for reviewing time limited licences.

What are the options for increasing water supply, and what are the arguments for and against?

Many reservoirs have been built to supply water to canals. Surface water run-off is a more useful supply for navigation when it can be discharged into a reservoir—otherwise the supply is likely to come mainly when existing sources are yielding plentifully. Water supply to canals can be increased by reusing water through backpumping; this is considered in more detail below.

6 Water Supplies Department, The Government of the Hong Kong Special Administrative Region website, www.wsd.gov.hk
**WATER MANAGEMENT: EVIDENCE**

*What are the likely future trends in water demand, and what can be done to manage demand more effectively, and to influence the behaviour of consumers and others?*

Water is transferred down the canal each time a lock is emptied or filled. Locks are emptied or filled each time a boat uses a lock to go up or down the canal. Locks need to be emptied or filled to get the water at the right level before use unless the last boat to use the lock used it in the opposite direction. Boats “taking turns” at a single lock satisfy the “cycle” calculation of demand; each full-length boat effectively using half a lock-full. In addition, the volume of water needed to fill a lock with one or more boats in it will be less than the volume of water needed to fill a lock without any boats in it. However, if a waterway is very lightly used then boaters will set a lock rather than wait for a boat coming in the opposite direction to use it. To manage demand more effectively, boaters can be encouraged to share locks and to wait for a boat coming in the opposite direction to use the lock rather than emptying or filling it with no boat in it in order to use it. Encouraging greater use of the waterways would be beneficial to a more efficient use of water as there would be more chance that boaters could share a lock or that there would be another boat coming in the opposite direction to use the lock alternately for greater efficiency.

*What contribution can science, engineering and technology make towards reducing water use or waste by households, businesses and public sector?*

Where there is sufficient water to replenish leakage and evapotranspiration but insufficient water for lockage requirements and where abstraction from other sources is impossible or expensive, backpumping offers a solution. It is environmentally attractive, despite its demand for power, since it makes no demands on other resources. Although the initial outlay for backpumping can be high, the running costs are relatively low and backpumping installations are, in fact, cheaper to build and operate than new side-ponds when whole-life costs are considered. It is generally most cost effective to use a fairly large diameter pipe for backpumping installations. Provided that locks are reasonably closely spaced then it is normally more efficient to backpump a whole flight than around each individual lock (because a major energy input, impellor loss at the pump, is minimised and one pumping station is cheaper than many).

Drainage inputs have long supplied waterways and many artificial cuts were constructed principally as drainage channels, including almost all Fenland waterways. More recently runoff from Dunsfold Aerodrome Runway is being used to supplement the Wey and Arun summit pound. One of the key benefits of the Bedford to Milton Keynes waterway is its ability to receive and store floodwater from urban developments (in addition to its ability to transport it) so that it can be released into natural watercourses more slowly than would otherwise be the case, easing downstream flooding and reducing the costs of additional control structures in natural watercourses. Surface water (storm water) drainage inputs suffer from a very wide range of flow: insufficient during drought and extremely high during storms. High inflows must be managed by provision of outlet spillways and weirs to prevent flooding of the waterway.

Science, engineering and technology can reduce leakage and seepage from waterways. British Waterways (BW) has developed a specification for a high standard clay puddle that states that the coefficient of permeability of the remoulded material should not exceed $10^{-7}$ cm/sec. This very low rate for seepage could be realistically used for total leakage if BW’s specification (for very plastic, flexible puddle) is applied and provided the puddle does not subsequently crack by completely drying out and it is not penetrated by roots or animals.

Seepage through modern linings such as bentonite matting or butyl rubber is similar to, or lower than, that for the fully engineered clay puddle. Manufacturers’ data for permeability assumes the lining is laid fully in accordance with their recommendations. In practice jointing faults create most leakage. Modern “thin” linings should be covered by a layer of material thick enough to ensure that impact by boats or penetration by poles does not damage the lining. Generally this means a 100mm layer of weak concrete, or at least 300mm of gravel, which helps protect the joints and prevent shear failure. Future leakage would probably be greater without such protection.

*The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at national and European levels, adequate?*

IWA believes that the legislative and regulatory framework is generally adequate.

The current exemption from licensing of navigation authorities under the Water Resources Act 1991 will end after December 2005 as the Water Act 2003 is fully applied. Nevertheless navigation authorities may continue to transfer water entirely within their own system or to transfer water from their own reservoirs into their own
system without an abstraction licence. This allowance helps to manage water shortage as water is being transferred rather than consumed and will help to ensure that there is sufficient water for navigation.

On the other hand, CAMS include provision for ‘licence trading’. So if all available resource at the point of proposed abstraction is already licensed then applicants for new licences may only be successful if they are able to persuade (by payment) an already licensed abstractor to relinquish part of their licence. Thus licences may be used to capacity with any spare capacity sold to another applicant. This is a major potential threat to navigation rights and IWA objected to the principles when they were first proposed.

August 2005

Memorandum by Martin Shouler, Arup

1. Defining the Problem

In the main, water supply in England and Wales is provided by a combination of surface and aquifer water sources. There are geographic regions where demand exceeds supply during periods of prolonged low rainfall. These can usually be managed by the imposition of supply restrictions, such as hose pipe bans and the control of other non-essential use. Historically, there have been few occasions where public health provision has been compromised due to the inability to provide water. However, there are environmental implications due to over abstraction during periods of low rainfall. These include low flows in rivers and reduced levels in ground water sources. Also the draw down of aquifer sources can lead to their pollution, for example, through salination in coastal regions.

Obviously, in simple terms the supply/demand balance can be met by developing new resources such as reservoirs and water re-use schemes and/or through the adoption of demand management measures. Demand management measures can be brought about by the installation of more water efficient water use products, services and appliances as well as campaigns designed to bring about the prudent use of water through behavioural change. These can be summed up as “hardware”—water efficient equipment and techniques and “software”—education, incentives and disincentives.

Demand management techniques reduce the overall water requirement and therefore require fewer resources to deliver in terms of treatment and pumping (energy) needs—reducing carbon emissions. In addition, by reducing hot water use (water that has been heated) further carbon emission savings can be made.

By its nature water supply is a regional issue as currently there is no water transfer network in use. A water transfer network would provide a certain degree of water security to water scare regions. However, it would be costly to build as well as associated operational pumping energy costs (water is a heavy commodity to transfer). In addition, there are issues related to regional differences in water quality parameters and their impact on the aquatic environment.

Water leakage from the public supply remains a constant issue. In addition to the water of resource, a high level of leakage will adversely affect the response from consumers to calls to moderate their consumption.

Climate change predictions suggest that England and Wales will experience wetter winters and drier summers and extreme events will become more prevalent. This will have implications for systems designed to effectively capture and store precipitation.

1.1 Current research

There are a number of research initiatives by government, the water industry and universities to predict future supply and demand requirements. Better coordination of this work is required. There are a number of loose networks of university, water industry and government sponsored work, for example the National Water Conservation Group (NWCG) and the WaterSave network. These bodies or the proposed Water Savings Trust (WST) could provide a co-ordinated approach to developing future scenarios.

1.2 Government, EU, regulators and industry response

Responsibility for security of water supply and the means to control water use is split across a number of government departments and organisations both private and public. Public bodies such as the Department of Environment, Food and rural Affairs (Defra), the Office of the Deputy Prime Minister (ODPM), the Environment Agency (EA), Office of Water Services (Ofwat), Consumer Council for Water (CCWater) all have different roles to play. There are opportunities to coordinate the related functions of these public bodies as well as the promotion of the importance of the wise use of water through public education campaigns. An
organisation which is tasked to take an overview would be a useful addition. Some consideration has been
given to the proposed role of a Water Savings Trust (WST).

Defra’s Market Transformation Programme (www.mtrog.com) predicts household water use and forecasts
future demand by building up a model micro-component use (appliances and water use). The model use data
on the type and quantity of installed appliances that contribute to overall water use, such as WCs, showers,
basins, tapware and external water use. The frequency of use and volume of water use is determined through
survey data. Future trends are forecast through consultation with manufacturers, industry, regulators and
experts. One trend of note is that personal washing is predicted to increase. This is a result, in part, in the
increase in the frequency of showering and new showering products delivering higher flowrates.

The Market Transformation Programme’s water use model could be used to test the impact of future policy
proposals.

2. Supply and Demand

2.1 Options for increasing demand

The development of new supply resources includes building new reservoirs as well as exploiting “alternative”
supplies such as rainwater harvesting, desalination and water re-use schemes. When considering these options
a Whole Life Cycle (WLC) approach should be taken. New reservoirs require a long lead time for planning
and construction. Although these supply assets will provide a robust solution, environmental impact issues
should be considered.

2.2 Behavioural issues

Demand can be controlled through the introduction of water efficient techniques and through changes to
behaviour. Education and financial incentives and be used to change behaviour. Water metering has a role
here as a demand management tool. A water appliance labelling scheme will give the consumer water use
information at the point of sale and will allow the section of efficient equipment.

It has been seen previously that the public reacts well during short periods of water shortage and will moderate
their water use.

2.3 Contribution of science, engineering and technology

Innovation in systems for the efficient water use, re-use and the use of alternative supplies will make a major
contribution to water demand. The use of water in buildings forms the largest component of the public
water supply.

Building design engineers have a role to promote sustainable water management systems in new build and
refurbishment. The Society of Public Health Engineers (SoPHE) part of Chartered Institution of Building
Services Engineers (CIBSE) has as one of its objectives the promoting sustainable water management
solutions. Best Practice in sustainable water management should be developed and promoted. This will enable
engineers to provide water efficient solutions, such as rainwater harvesting.

The Market Transformation Programme is developing a water appliance labelling scheme on behalf of Defra
which if adopted will encourage manufacturers to innovate.

3. Infrastructure

3.1 Water supply and drainage infrastructure

Much has been done to reduce water leakage from the supply infrastructure. The setting of targets has focused
water industry resources, however, there are high water leakage levels in some regions which not only result
in water waste but may negatively affect water wise campaigns.
3.2 Water Act 2003

The Water Act 2003 has led to a much improved regulatory framework, however, better resources, implementation and coordination is required.

3.3 Water use and development

Currently, water use by appliances in buildings is controlled by the Water Supply (Water Fittings) Regulations 1999. Currently the review of Building Regulation Part G (Hygiene) is considering setting minimum standards for water using equipment in buildings. There are voluntary environmental schemes such as BRE’s BREEAM EcoHomes which recognise the installation of water efficient measures. The proposed Code for Sustainable Buildings can extend the impact of voluntary schemes to publicly procured buildings which will have a effect on the market for efficient equipment. Planning has a role in controlling water use in future developments. Water scarcity should be considered in the planning process.

3.4 Learning from other countries

The UK can benefit tremendously from the transfer of technology and experience with other countries. Networks such as CIB (International Council for Research and Innovation in Building and Construction) provide a forum to bring together researchers and engineers from across the world. For example, the Market Transformation Programme is informed on its development of a voluntary labelling scheme for water using appliances from experience on a similar scheme in Australia.

October 2005

Memorandum by Milton Keynes Friends of the Earth

Milton Keynes Friends of the Earth (MK FoE) is an active local group, representing national Friends of the Earth in the MK area. The national organisation has about 800 members in the MK area. Milton Keynes is a comparatively dry area, and is subject to considerable development pressure. Water is a strategic limitation to the area’s continued housing growth, and the MK FoE group has frequently been asked to comment on water issues, particularly in the context of the Examination in Public into the MK and South Midlands “Sustainable Communities Plan”.

This report will not seek to address all the issues raised, but will concentrate on specific questions, principally those relating to water economy in new settlements.

Summary

Milton Keynes is an area of rapid development as part of the Government’s unsuitably named “Sustainable Communities Plan”. The Government’s approach of rapid residential development in SE England is an attempt to address problems in the housing market—but it threatens to put severe strain on the regional environment, and breach fundamental environmental limits of sustainability. Water is a major part of this framework of limitations. Currently, there are insufficient safeguards to ensure that the long term economic and environmental sustainability of properties constructed. Water efficiency (or the lack thereof) is a notable example of this failure to act to ensure sustainability.

Not only does the Government’s water policy framework fail to address problems we can expect in the current climate, its limitations are even more starkly revealed when climate change is taken into account. We should be planning for large and possibly unpredictable changes to rainfall patterns and hence water availability. Given that there are high risks of significant shortages at the current time, we are clearly heading for a period of much greater uncertainty in supply levels when climate change is considered. The failure to address these potential problems illustrates a short-term approach in Government.

Defining the Problem

What are the causes of the current problems of water supply, and how serious are they?

The Government is currently taking no account of water supply when locating major new developments. Further, little requirement for water economy is definite in development proposals. Changing demographics are resulting in higher water use, as the population grows and tends to occupy smaller households. The Government is not currently seeking to incentivise increased occupancy levels in domestic properties—in fact
much of the recent legislation regarding private rented property is tending to act to split up Houses in Multiple Occupancy and thus drive down occupancy levels further. This poses fundamental challenges, and many obvious solutions (e.g., promoting higher occupancy, relocating major developments) are being ignored. Whilst consideration of flooding is outside the scope of the this committee’s work, the issues of water supply and flooding are actually inseparable, as lack of rainwater harvesting in new developments will exacerbate flooding caused by runoff storm surges. Mandatory installation of rainwater harvesting technology in all new premises would greatly reduce the flood pressure caused by new developments.

The lack of consideration of water in major developments has gone so far that the Aylesbury area will need to have its water pumped in and its sewage pumped out. This is a waste of energy and symptomatic of a total failure to allow design to flow with the natural environment rather than against it. Aylesbury is currently the only area in the UK where such double pumping is proposed.

Is the response of Government, the EU, regulators and the industry adequate?

Particularly as regards new development, the government is making little attempt to reduce the need for central water supply networks using rainwater harvesting, water recycling systems and demand management. The water industry is equally unfocussed on controlling water demand.

Of notable concern is the implication that the existing residents of areas suffering from development pressure may face increased charges for water as a result of often profligate demand in new settlements.

There needs to be a step change in water efficiency of newly installed plant, appliances and premises. In order to reverse the growth in water use, urgent action needs to be taken. Demographic and lifestyle change will continue to generate new demand, and efficiency must improve radically in order to overtake this generated demand and drive consumption down to a level sustainable in a changing climate. This can only be achieved by a combination of regulation and a new approach to price signalling.

Supply and Demand

What are the options for increasing water supply, and what are the arguments for and against?

The options for water supply increases are principally divided into two areas: Either increase the supply to properties, or allow them to create an increased useable supply on site by rainwater collection or recycling. The latter option is grossly under-used in the UK, and consequently the long-term cost and environmental advantages are not realised. The principle reason for this is a lack of compulsion on developers to set the long term against the short term and install the necessary infrastructure at the time of construction—which is the only sensible time to do it. This lack of focus in government policy inevitably results in increasing the supply TO rather than WITHIN the property being the only solution given serious consideration. Therefore, proposed supply side solutions are centred only on increasing reservoir capacity and using modified regional piping infrastructure to feed areas of high demand. Instead, the focus must be on providing increased incentives for domestic and business users to harvest and recycle water sufficient to meet their own needs.

What are the likely future trends in water demand, and what can be done to manage demand more effectively, and to influence the behaviour of consumers and others?

Household fragmentation, which the government is making no attempt to control, will drive up domestic water demand. Further, housing growth in the driest regions of the UK will drive up demand and prices in these critical regions. There needs to be a major shift in thinking and in policy to arrest this.

Consumer behaviour is hard to influence in the short term, due to it being largely fixed by consuming appliances and household/industry type. Seeking direct behavioural change from consumers should be seen only as a minor part of an overall management package. A hierarchy of approaches in needed:

1. It is necessary to address the issue of water more effectively in regional policy at the start, not leave it to the water companies as a bolt-on solution.
2. It is necessary to ensure that properties when constructed or converted are able to generate their own water through capture and recycling. Regulation and incentives are needed.
3. Appliances and plant must be designed to minimise water use, and information improvements and price signals must be given to assist this.
4. There remains a case for metering, but its benefits are more marginal than is often believed due to high “built-in” demand.
Central to demand reduction is the use of price signalling and regulation to influence fixed demand from consumers. Building regulations must be tightened, particularly in major new developments to include a requirement to fix rainwater harvesting and/or water recycling equipment at the time of construction. Water using appliances must be rated in the same way that white goods have been rated for energy efficiency. Later, this rating system can be used as the basis for a differential tax banding system for water using products. For example, a hike of £100 in the price of a thirsty washing machine would force manufacturers to use more economical designs.

Ratings for “whole home” water efficiency should be included as a matter of course in developer’s literature and also in the documentation relating to the sale of “used” properties—similar to the A to G efficiency ratings given to white goods. This will again give the opportunity to introduce differential taxation—eg a lower rate of stamp duty for water efficient homes. An alternative to stamp duty changes is to use the “home water efficiency rating” to set the water bill, rather than the property type. This would enable a meaningful correlation between charges and consumption, without the installation and billing overheads associated with meters.

Water metering is a tool for controlling demand, but it must be recognised that this is not the only method available to reduce demand, or indeed to link price and demand. The most effective price signalling is that which is most closely focused on the point of decision. A family may not wash less if a meter is installed, but they may well choose a more efficient washing machine if a tax band is used to incentivise the purchase of a more efficient model. Water metering is a useful tool particularly in areas of critical supply and demand balance, where immediate reductions to demand are needed to avert water shortages. It may also be appropriate to restrict, tax or prohibit the use of certain appliances, such as hosepipes, swimming pools and power showers in unmetered properties.

**What contribution can science, engineering and technology make towards reducing water use or waste by households, businesses and the public sector?**

We already have the technology. Rainwater harvesting, grey water recycling, low water irrigation, metering and efficient plant and white goods are all available. We simply need to use a combination of regulation, information and taxation to encourage the uptake of these methods. The contribution that can be made through engineering is likely to substantially outstrip the contribution that is realistically achievable by behavioural change. Furthermore, the shift achieved from engineering-based approaches is more sustainable as it does not depend on continued individual action.

In the main, the barrier to uptake of engineering-led economy measures is a lack of adequate price signalling. If piped water cost the same amount as bottled water, every house would be built with rainwater capture. The government’s role should be to introduce adequate information systems (such as efficiency labelling) and then apply price discrimination (such as point of sale taxation) to these information systems in order to create a demand-pull for appropriate technology (such as more lower-flush toilets). There is also a role for outright regulation, particularly in building regs, to ensure regional demand is controlled by the inclusion of development-wide installation of appropriate technology. There is simply no excuse for building housing estates which use drinking water to flush toilets.

**Infrastructure**

**What is the current state of the water supply and drainage infrastructure? Is there sufficient investment in its improvement?**

Whilst it is beyond the capacity of MK FoE to make comprehensive general comments on the state of the infrastructure in the UK, there are several points of concern we wish to raise.

Firstly, there is a large strain being placed on existing infrastructure by profligate and ill sited new development. Often, this imposes disproportionate costs on the system, and this may be passed on to “innocent” existing consumers.

Secondly, sewage treatment is inadequate at controlling micro-pollutants such as the contraceptive pill. This is causing serious effects in the natural environment, such as disruption to the sexual development of fish. There is also serious concern that the re-uptake of this sewage into the drinking water supply is affecting human health. It is commonly implicated (as part of a range of man-made chemicals) in rising levels of precocious puberty in girls and problems in the sexual development and function of men.
Thirdly, the increase in flash flooding expected as a result of climate change, exacerbated by the increase in tarmac and roof area in the UK, needs to be considered when analysing the adequacy of drainage systems. The recent failure of London’s drainage system and the resulting discharge of sewage into the Thames is an example of this (it was greatly exacerbated by driveway paving). Major upgrades are clearly needed in large parts of the network. Better regulation to ensure water balancing is vital—for example restricting the use of non-porous surfaces in gardens and on driveways.

Finally, distribution wastage remains unacceptably high, and must be better controlled.

**Context**

_The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at national and European levels, adequate?_

There is a clear failure to legislate effectively to control demand, improve economy and reduce wastage. Numerous examples have been given elsewhere in this response and there is little to gain from repeating them in this section. Particularly, there is a limited range of fiscal options available for incentivising efficiency, and there is also inadequate regulation of building standards and installed appliances. New legislation may be required.

_How does water figure in the development of Government policy in areas such as housing, land use planning and industry?_

Water is barely a footnote in current government policy, planning and thinking. The ill planned development in the MK area is a specific example of the government’s failure to consider either the current limitations of the water supply infrastructure in the UK, or the potentially catastrophic further changes that climate change may cause. A quantum leap in thinking and preparation is required to avert severe future problems.

*August 2005*

**Memorandum by The Royal Academy of Engineering**

1. **Defining the Problem**

1(a) _What are the causes of the current problems of water supply, and how serious are they?_

1.1 A major problem of water supply is caused by the rising demand associated with the increase in population in the South East of England. The number of households in this region has risen without a concomitant increase in water supply. This is especially problematic since the South East is the area of England with the driest climate. Problems will undoubtedly be exacerbated if housing development proceeds in areas that are already subject to water supply stress, eg Ashford and Thames Gateway.

1.2 There has also been a general increase in the demand on water supply from households. This demand increase is due to changing socioeconomic conditions which have led to greater ownership and usage of water using appliances such as washing machines and dishwashers. The nature of the demand from households has also changed, becoming increasingly “peaky”, with much higher demand in the Summer than the Winter months.

1.3 This pattern of demand is obviously in negative correlation to the pattern of rainfall, which is greater in the Winter than in the Summer. This seasonal discrepancy in rainfall is becoming more dramatic due to the effects of climate change, since climate change has led to wetter Winters and drier Summers, and to increasingly frequent occurrences of extreme weather. These effects are likely to become more severe in the future and will lead to problems of lack of raw water availability in the Summer months, and to a strain on the treatment works and distribution systems during periods of high demand.

1.4 Climate change is therefore leading to general, long term problems of water supply, but there is also the more immediate problem of a recent sustained period of below average rainfall (nine months) which has depleted ground water resources, depleted stocks in reservoirs and led to low flow in rivers. Such problems of localised periods of low rainfall can and should be dealt with by restrictions on water use. However, since privatisation restrictions on water supply such as hosepipe bans have been treated as less acceptable by the media and the public.
1.5 Leakage has been a problem in the past and, as a result, it has received a great deal of attention by water companies. The improvements in this area are such that we are now at a point where further improvements would be too costly in comparison with the savings that they would deliver.

1.6 Tougher legal safeguards to protect environmentally important sites have reduced the availability of natural supplies from which water can be drawn. Standards for drinking water have also risen but, the creeping contamination of water resources (such as increases in levels of nitrates in the water which is expected to worsen over the next 5–10 years) means that such restrictions have led to a reduction in deployable resources.

1(b) What are the projections for future water supply, and what factors will influence these projections? Where, and over what timescales, may problems emerge?

1.7 Projections for future water supply are prepared by the Environment Agency and by water companies. These projections are generally taken to be quite adequate predictions of future water supply. However, some projections are based on plans produced by water companies in the south east which include figures for housing growth that are 20 per cent lower than given in the Office of the Deputy Prime Minister’s Sustainable Communities plan. Furthermore, these projections do not factor in increases in non-household use that will arise from the creation of employment for the members of these extra households.

1.8 Reliable supply is likely to reduce in all parts of the country, due to a number factors. First there are the broadly social factors of growth in the number of households (significant housing growth being projected for both the south east and the south west regions), economic growth, socioeconomic changes and changes in behaviour (behaviour is likely to change as a result of increasing awareness of water supply issues, and potentially as a result of the implementation of water metering). Environmental factors that will influence projections are higher quantities of wastewater effluent, depleting groundwater resources, future rainfall, eutrophication of reservoirs due to agricultural practices (which is expected to worsen over the next 5–10 years), and increases in nitrates in the water. Supply is also forecast to reduce over the next 5–15 years as a consequence of environmental legislation such as the Habitats and Water Framework Directives, and the Environment Agency’s abstraction management policy requiring reductions to company abstraction licences.

1.9 Climate change is also a significant factor, and will affect future water supply in a number of ways. Higher temperatures will lead to higher levels of evapotranspiration. There will be reduced river flows in summer, meaning less and poorer quality water, and these lower river and groundwater levels are likely to lead to pressure to reduce abstraction. Lower dilution in reservoirs will result in water needing more treatment, and will exacerbate the problems of eutrophication. There will be more severe and frequent droughts, and hotter summers will tend to give rise to higher demand in the summer months.

1.10 Problems of future water supply will be most acute in the south east of England, where demand will outstrip supply in this region unless planned new resources are developed. Problems in this region will be much more prominent over the next decade.

1.11 There exists potential for much greater supply, but any increase will incur environmental and economic costs. A problem that threatens water companies’ plans to increase supply is that many of those plans are dominated by major resource development, but implementation of such developments is lengthy (15–20 years) and fraught with uncertainties.

1(c) Is sufficient research being devoted to predicting, and handling, possible future scenarios?

1.12 Research carried out by the Environment Agency and by UKWIR (UK Water Industry Research) is largely accepted as substantial and useful, especially as it involves input from the water companies, and therefore addresses real, live problems. The Met Office’s Hadley Centre also carries out useful research into predicting future climate change. The research pursued in the shape of the Foresight scenarios produced by the Office of Science and Technology has some value, but its strategy of looking into all possible scenarios means that it tends to be too broad to be of practical use. Since it is not possible to plan for all eventualities, it is more valuable to focus on most likely scenarios.

1.13 However, there are still a number of uncertainties affecting possible future scenarios. These include both climate change and changing behaviour in the face of climate change, future housing growth, and the effects of metering. There is also insufficient research on the impact of the EU framework on the future water supply of the UK. There would be value in carrying out careful research on water transfer between companies, especially investigating whether it can be done without adverse impact on the supply-demand balance of the transferring company. Generally, there needs to be more collaborative work between water companies, focusing on issues of national interest and sustainability rather than common industry issues.
1.14 Research in this area is hampered by the fact that the UK does not have the state-of-the-art planning technologies of other countries. The hydrological models currently used for planning are based on limited data and solution techniques.

1(d) Is the response of the Government, the EU, regulators and the industry adequate?

1.15 The “twin track” model, focusing on managing demand, and on implementing new resources to meet demand, is generally appropriate. However, there is room for improvement in that, since the Environment Agency and Ofwat both tend to resist new development, the twin track approach has so far focused much more on decreasing demand than on building more resources. This is diminishing the “slack” or “headroom” in the system between available resources and demand, and means that in times of drought it becomes apparent that demand has outstripped drought-reliable resources. There is need, therefore, for an advocate for pro-development work, to establish a better balance between the two “tracks”. In addition, the long planning times associated with implementing new resources means that, although the water companies and regulators are aware of problems, they face difficulties in addressing them.

1.16 On the part of the regulators, Ofwat’s role in developing a common framework for asset management planning centred on service quality has led to an improvement in asset planning. However, Ofwat’s focus on keeping down prices inhibits actions that could prevent leakage, and its five-year regulatory period is too short for it to deal with the development of new resources. A clear and unified policy from Ofwat and the Environment Agency on issues such as metering and water conservation would be of benefit to public water supply.

1.17 Government could improve its response in a number of ways. Possibilities include amending building regulations to ensure that new houses have water efficiency incorporated into their design; exploring means of implementing water metering more swiftly; introducing financial incentives for grey-water re-use and sustainable drainage systems; and constructing innovative tariff structures to drive down demand in non-household sectors.

2. Supply and Demand

2(a) What are the options for increasing water supply, and what are the arguments for and against?

2.1 The following is a list of some of the options for increasing water supply, with brief comments on their respective benefits and drawbacks. Each of the options shares the drawback of incurring some environmental damage. A more extensive list is included as Appendix A.

New reservoirs
This is the classical and most obvious response to water supply issues, as reservoirs provide a reliable resource, and can be used to capture the extra rainfall at times of low demand. However, they tend to meet resistance on environmental grounds, and there is a long period of time between initial planning and completion (up to 20 years). The capacity of some reservoirs may be extended by raising their dam/water levels, reducing the need to develop new reservoirs. Where available, a related option is to employ redundant quarries as a way of putting retired resources to good use presenting environmental benefits, but it would provide a low yield.

Desalination
The costs of this technology are falling, but plants are still expensive, consume a great deal of energy, and can be damaging to the coastal environment. Reverse Osmosis (the subject of proposals by Thames Water) presents an interesting option—the technology is improving, though again it is costly to run, requiring high levels of energy. However, plants could be used only when the need was felt—such as in times of high demand during the summer. The real costs of desalination depend of course on the salinity of the abstracted water—they are more cost-effective in estuaries than in coastal regions.

Groundwater development
This can be done at a relatively low cost, but will lead to low river flows and affect the riverine habitat.
Leakage control

Much has already been done to stem water leakage, and further work in this area is likely to be uneconomic, especially as it is improbable that leakage can be eliminated entirely.

Licence changes

Changes to current licensing restrictions could be carried out at no financial cost, but would be potentially costly in environmental terms. However, it is questionable whether all river abstraction restrictions are appropriate, and there may be value in examining current restrictions on abstraction licences.

Bulk transfers

This is an option in regions where adjacent areas have enough water to donate. However a national water grid, while it would even out geographical imbalances, is made unfeasible by the costs of transporting water.

Water re-use

There needs to be more research into effective water recapture, recycling and re-use. Recycling of sewage works effluent is also a favourable option where the geographic setup is appropriate.

2(b) What are the likely future trends in water demand, and what can be done to manage demand more effectively, and to influence the behaviour of consumers and others?

2.2 Household demand has risen steadily over the last 70 years and is likely to continue to rise into the immediate future. Household demand is also likely to become “peakier” given climate change. However, it is also likely that increases in household use will slow after 10 years due to ownership of water using devices reaching 100 per cent, appliances with greater water efficiency being introduced, and the increased penetration of metering. Non-household demand is likely to decrease then stabilise over the next ten years, due to the shift away from heavy industry and industry’s recognition of the benefits of water re-use. It is possible that the rise in domestic per capita use coupled with increases in leakage control, reaction to climate change, and declining use by industry might lead to an overall decrease in demand by about 2030.

2.3 Metering represents the greatest opportunity for managing demand. It will be especially effective if introduced alongside sophisticated pricing structures such as: rising block tariffs; high season excess surcharges; volumetric charges for excessive users; special charges for owners of sprinklers and swimming pools; and special tariffs for industries with seasonal variations in use, such as the tourist industry. Even if the evidence is not clear that metering drives down overall consumption, it tends to lessen the phenomenon of high seasonal demand. To address the issues of costs involved in introducing metering, it may be helpful to introduce a programme of placing meters in areas of high demand, only bringing them into commission when house owners change. Installing meters in bulk like this, rather than only in response to individual demand, will mean a drop in unit price. However, there is a need for more sophisticated meters than those currently available if variable tariffs are to be implemented.

2.4 If metering is implemented the Government must takes steps to protect lower income families. It will also be necessary to ensure that water companies do not abandon their obligation to improve efficiency levels in order to maximise revenue, and to guard against the opinion amongst consumers that if they pay for their water, they can use as much as they choose to pay for.

2.5 There is a general need to raise awareness amongst the public of the value of water and to encourage them to be more responsible consumers. For example, it is important to promote public acceptance of hosepipe bans—which should be accepted as necessary during extended periods of dry weather. Water companies can play a role by giving more advice on saving water, including information about the water consumption of household appliances. For example, Water UK announced the launch of the “WaterWise” initiative in 2005, building links between affordability and water efficiency and promoting the benefits of water efficiency to customers.

2.6 Demand can be further managed by introducing water saving appliances such as low water-consuming washing machines, dishwashers, low flush toilets, spray taps and push-taps which automatically stop, low-volume showers, trigger-gun hosepipes and so on. Central and Local government can also take action by making sure new public and private developments incorporate water efficiency into their design.

See Appendix B for an extended list of measures for managing demand.
2(c) What contribution can science, engineering and technology make towards reducing water use or waste by households, businesses and the public sector?

2.7 Science, engineering and technology can play a useful role by developing the next generation of software tools to refine the distribution of water, and to gain greater accuracy in understanding the ways that water resource availability fluctuates seasonally and yearly. There is also room for technological developments for managing abstraction, treatment, distribution and collection so as to avoid wastage and damage to the environment. This could include increasing the efficacy of wastewater treatment works to allow the use of recycled water, and the development of Reverse Osmosis technology.

2.8 There is also a contribution to be made via refinements to household commodities that use water to make them more water efficient—though they must also be cheap to fit and aesthetically acceptable. However, the demand for such items will only become sufficient to motivate such developments when household metering is made compulsory. The major issue concerning managing demand is that of changing people’s habits and perceptions, and this is a political or social matter rather than an issue that can be addressed directly by science, engineering and technology.

3. Infrastructure

3(a) What is the current state of the water supply and drainage infrastructure? Is there sufficient investment in its improvement?

3.1 Unlike in the past, there is now good awareness of the condition and performance of the water supply network. The network is reasonably well-maintained, generally stable, and its performance broadly optimal. The condition of the infrastructure has improved significantly since privatisation, after which there was significant investment by water companies. However, far less is known about the condition of the drainage structure, since Ofwat adopted the strategy of gathering information on only 15 per cent of the network, and dealing with the remainder on a reactive basis.

3.2 There are nevertheless some threats to the water supply and drainage infrastructure. The system is working closer to capacity for more of the time than it has had to in the past. More frequent storms due to climate change might damage existing assets, for example, severe storms might highlight the under capacity of the storm sewer systems. Therefore, there is a need for further investment in the infrastructure, especially given the nature of past investment. For whilst water companies invested heavily in the infrastructure, the investments since privatisation were in short and medium life assets which need replacing more often, and hence investment in longer life assets will be necessary for them to be modernised and replaced in the medium to long term.

3.3 The infrastructure is currently managed via the concept of serviceability—according to current level of performance, rather than actual condition. However, serviceability is something that can only be assessed over the long term, which is at odds with the five year financing cycle of the water industry. Furthermore Ofwat’s policy is to take as a benchmark for investment what has been spent historically, and this will mean stability in expenditure on renewing the infrastructure. But it is bound to be the case that the scale of investment will have to rise significantly in the future, since the scale and complexity of the infrastructure has risen vastly in the last 70 years. Hence, instead of seeking to suppress expenditure, it would be beneficial to identify those parts of the infrastructure that could be replaced now. There is a need for investment in the integration of drainage and water use—leading to more sustainable water management.

4. Context

4(a) The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at national and European levels, adequate?

4.1 The legislation is largely adequate, and it is appropriate that a duty of care should be placed on the water companies and Defra for the efficient use of water. However, the government should do more to raise public awareness of the challenges regarding water supply, and to explain the need for higher water charges. Government should do more to accelerate the introduction of metering, and should revisit legislation on banning disconnection as penalty for non-payment of bills, to ensure that the public are prudent users of the water supply.

4.2 There is a need to encourage Ofwat to pay more attention to the adequacy of water supplies, rather than focusing on keeping water prices down. Healthy competition between the Environment Agency and Ofwat could be encouraged to combat the general resistance to improvement.
4(b) How does water figure in the development of Government policy in areas such as housing, land use planning and industry?

4.3 Water management appears to figure very little in the development of Government policy on housing, land use planning and industry. Water companies are not, but should be, statutory consultees in the planning process. Specifically, there is a real problem with the development of new homes in the south east. The developments are inadequately thought through in terms of the converse problems of flood risk (too much water) and water supply (too little). The Sustainable Communities plan should feature water more highly than it appears to, having directed housing growth to the area with the driest climate. Once involved in the policy process, water companies should also be given the means to implement the appropriate policy: financially; in terms of timely granting of planning permission; and by the acceptance of some degree of environmental damage.

4.4 There is a strong need for joined-up policy in relation to supply and demand from water companies, central and local government, and the regulators (Ofwat, Drinking Water Inspectorate and the Environment Agency). We must learn from New Orleans the dangers of becoming complacent in the face of the non-occurrence of predicted climatic risks, and hence being unprepared when disasters occur.

4(c) What can the UK learn from the experience of other countries?

4.5 It is widely accepted that the UK is a world leader in the area of water planning and management but, there are lessons to be learnt from other countries. Metering is the norm in most developed countries, as are intelligent tariff structures, and penalties for non-payment of bills—Singapore and Holland are good examples for their use of meters, tariffs and itemised billing. Lessons can be learnt from countries such as Singapore that reuse water efficiently, and countries that use minimally treated seawater for toilet flushing.

4.6 Benefits may be gained from making water company resource plans public documents, giving the opportunity to open public debate about water as a valued resource. Exemplary countries with regard to water and land management policy are Holland, France, Germany, and other parts of the EU, Singapore, Australia, Japan, South Africa and the US. The situation in the UK might be improved if the more streamlined planning timescales of Singapore, France and other European countries were employed. Opportunities also exist to learn the value of research into water management as pursued in Australia and the US.

4.7 Following privatisation of the UK water industry, many of the UK water companies are now owned by non-UK organisations. This should ease the transfer of knowledge and experience gained in other countries.

September 2005
## APPENDIX A

### OPTIONS FOR INCREASING WATER SUPPLY

<table>
<thead>
<tr>
<th>Option</th>
<th>For</th>
<th>Against</th>
</tr>
</thead>
<tbody>
<tr>
<td>New reservoirs</td>
<td>Reliable yield</td>
<td>High capital costs</td>
</tr>
<tr>
<td></td>
<td>Relatively low operating cost</td>
<td>Planning issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Environmental concerns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Loss of land</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lead time</td>
</tr>
<tr>
<td>Dam raising</td>
<td>Low operating costs</td>
<td>Dams not always suitable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yield may not necessarily increase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Further land loss</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Environmental concerns</td>
</tr>
<tr>
<td>Pumped storage</td>
<td>Relatively low capital cost</td>
<td>High operating costs</td>
</tr>
<tr>
<td></td>
<td>Better use of existing storage</td>
<td>Not all reservoirs are suitable</td>
</tr>
<tr>
<td></td>
<td>Low environmental impact</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No loss of land</td>
<td></td>
</tr>
<tr>
<td>River intakes</td>
<td>Little or no summer yield</td>
<td>Low capital cost</td>
</tr>
<tr>
<td></td>
<td>Low capital costs</td>
<td>Poor water quality</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Possible environmental concerns</td>
</tr>
<tr>
<td>Licence changes</td>
<td>Virtually no costs</td>
<td>Environmental concerns</td>
</tr>
<tr>
<td>Boreholes</td>
<td>Usually good quality water</td>
<td>Not all areas suitable geologically</td>
</tr>
<tr>
<td></td>
<td>Incremental developments possible</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low environmental impact</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relatively low capital costs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relatively low operating costs</td>
<td></td>
</tr>
<tr>
<td>Aquifer recharge</td>
<td>Low environmental impact</td>
<td>Not all geology suitable</td>
</tr>
<tr>
<td></td>
<td>Relatively low capital costs</td>
<td>Mixed results from trials</td>
</tr>
<tr>
<td>Conjunctive use</td>
<td>Effective use of existing system</td>
<td>Complexity of operation</td>
</tr>
<tr>
<td></td>
<td>Low environmental impact</td>
<td>Water transfer costs high</td>
</tr>
<tr>
<td>Bulk transfers</td>
<td>Effective use of resources</td>
<td>Adjacent areas may not have surplus</td>
</tr>
<tr>
<td>Water grid</td>
<td>Evens out surplus/deficit areas</td>
<td>High operating costs</td>
</tr>
<tr>
<td></td>
<td>Low environmental impact</td>
<td>High capital costs</td>
</tr>
<tr>
<td>Desalination</td>
<td>Reliable and unlimited yield</td>
<td>High operating costs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High capital costs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Environmental costs</td>
</tr>
<tr>
<td>Redundant quarries</td>
<td>Effective use of redundant workings</td>
<td>Low yield</td>
</tr>
<tr>
<td></td>
<td>Environmental benefits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low capital costs</td>
<td></td>
</tr>
</tbody>
</table>
**APPENDIX B**

OPTIONS FOR THE EFFECTIVE MANAGEMENT OF DEMAND

<table>
<thead>
<tr>
<th>Option</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compulsory metering</strong></td>
<td></td>
</tr>
<tr>
<td>— Industrial premises</td>
<td></td>
</tr>
<tr>
<td>— Commercial and public sector premises</td>
<td></td>
</tr>
<tr>
<td>— Swimming pool owners</td>
<td></td>
</tr>
<tr>
<td>— Sprinkler/hosepipe users</td>
<td></td>
</tr>
<tr>
<td>— Households with an outside tap</td>
<td></td>
</tr>
<tr>
<td>— Households in water-shortage areas</td>
<td></td>
</tr>
<tr>
<td>— Households where a meter or meter box already exists</td>
<td>There are very few non-domestic properties in most areas which are not metered. Owners of swimming pools, sprinklers and power showers are required to register with the Company which retains the right to meter them.</td>
</tr>
<tr>
<td><strong>Meter installation policy</strong></td>
<td></td>
</tr>
<tr>
<td>— Installation meters/meter boxes when premises change ownership</td>
<td></td>
</tr>
<tr>
<td>— industrial</td>
<td></td>
</tr>
<tr>
<td>— commercial and public sector</td>
<td></td>
</tr>
<tr>
<td>— households</td>
<td></td>
</tr>
<tr>
<td><strong>Introduction of special fees</strong></td>
<td></td>
</tr>
<tr>
<td>— Introduction of separate additional fees for:</td>
<td></td>
</tr>
<tr>
<td>— sprinkler users</td>
<td></td>
</tr>
<tr>
<td>— hosepipe users</td>
<td></td>
</tr>
<tr>
<td>— outside tap users</td>
<td></td>
</tr>
<tr>
<td>— swimming pools</td>
<td></td>
</tr>
<tr>
<td><strong>Changes to existing measured tariffs</strong></td>
<td>Some tariff structures require more intelligent meters than are currently installed.</td>
</tr>
<tr>
<td>— Discontinued declining block rate tariffs</td>
<td></td>
</tr>
<tr>
<td>— Discontinued “neutral” charges</td>
<td></td>
</tr>
<tr>
<td>— Increasing the volumetric charge</td>
<td></td>
</tr>
<tr>
<td>— Introducing rising block volumetric charges</td>
<td></td>
</tr>
<tr>
<td>— Introducing Summer/Winter or other seasonal tariffs</td>
<td></td>
</tr>
<tr>
<td>— Introducing daily/peak/off-peak tariffs for at least some seasons</td>
<td></td>
</tr>
<tr>
<td>— Charge only above a defined “subsistence” level of use (to protect low income families)</td>
<td></td>
</tr>
<tr>
<td><strong>Introduction of special tariffs for specific users</strong></td>
<td></td>
</tr>
<tr>
<td>— Introducing “interruptible” industrial supplies</td>
<td></td>
</tr>
<tr>
<td>— Introducing lower charges for major users with significant storage</td>
<td></td>
</tr>
<tr>
<td>— Introducing higher-cost “ban-free” sprinkler or hose pipe licences</td>
<td></td>
</tr>
<tr>
<td>— Introducing spot pricing for selected customers</td>
<td></td>
</tr>
</tbody>
</table>
### Option

**Targeted water conservation information (advice on appliance water usage)**

- Industrial customers/bodies
- Commercial customers
- Households
- Public sector (e.g., schools, hospitals, community groups)
- Recreation facilities (parks and gardens, golf courses)
- Designers of hot water systems, taps and water using appliances
- Purchasers of water-using appliance (i.e., in showrooms)
- Labelling water consumptions of appliances

**Comments**

This information is usually provided by water companies as part of their water conservation strategies but perhaps would be better if nationally coordinated.

### Option

**Advice and information on direct abstraction and irrigation techniques**

- Drip vs spray irrigation
- Direct abstraction
- Other techniques for reducing evaporation

**Comments**

Most water companies provide a lot of advice on the use of water in gardens and on irrigation techniques.

### Option

**Advice and information on leakage detection and fixing techniques**

- Industrial
- Commercial and public sector
- Household
- Agricultural

**Comments**

This type of advice and information is already given as part of companies’ water conservation strategies.

### Option

**Water saving devices**

- Appliance exchange programmes
  - washing machine
  - dishwasher
  - WCs
  - other
- Company subsidy to appliance manufacturers
- Company subsidy to consumers for the purchase of water saving appliances
- Encouraging or requiring greater use of water saving technology in new and/or existing buildings (industrial, commercial, public sector and household)
  - fitting of showers
  - low volume shower heads
  - limiting purchase/use of “power showers”
  - low flush toilets
  - dual flush toilets
  - fitting new toilets
  - composting toilets
  - waterless urinals
  - retrofitting existing toilets
  - shallow trap toilets
  - flush controller for urinals
  - timing devices
  - “people detectors”
- self-closing taps (i.e., push operation taps that cut off the supply after a short time)

**Comments**

These devices are constantly being trialled and assessed by the water industry.
WATER MANAGEMENT: EVIDENCE

Option | Comments
--- | ---
— spray taps | — toilet bags cistern dams (by displacing part of the cistern volume, reduce the flush volume
— hose activated by a spring loaded trigger mechanism
— limited purchase/use of instantaneous water heaters/boilers
— research and development into water saving technology

Recycling and re-use | Where appropriate water companies encourage the use of recycling and “grey water”. However it is essential that there is absolutely no risk of cross contamination with consequent risks to public health.
— Encouraging or requiring indirect waste water re-use (i.e. abstraction downstream from the discharge of treated waste water e.g. for agricultural irrigation and industrial cooling)
— Encouraging or requiring direct waste water re-use (i.e. use of treated waste water via pipes or other conveyance)
— Encouraging or requiring water recycling (i.e. direct use of untreated “grey water”)
— industrial
— commercial and public sector
— household (e.g. using water from bath/shower/basins for toilet use
— fitting recycling systems in new houses
— fitting recycling systems to existing houses

Memorandum by The Royal Society for the Protection of Birds

EXECUTIVE SUMMARY

1. Whilst the drought of 2005 remains confined to parts of south-east and south-west England, a combination of rising numbers of households, increased per capita demand and poor raw water quality is putting pressure on water resources across England and Wales. Climate change will increase these pressures.

2. The aquatic environment is in a poor state, with over 45 per cent of freshwater Sites of Special Scientific Interest (SSSIs) in England in unfavourable condition, partly because of the impact of abstraction and water scarcity. Ninety two per cent of water bodies in England and Wales are at risk of failing to meet new measures of ecological water quality to be introduced under the implementation of the EC Water Framework Directive. Abstraction of water has been identified as one of the key pressures, responsible for 11 per cent of probable river failures.

3. Current policy and practice is inadequate to meet the challenges posed by water resource scarcity and climate change. Land-use planning is not linked to water scarcity; demand management and leakage control are poor; strategic management of abstractions is lacking, and water company plans focus on the development of new resources to the exclusion of other more sustainable approaches.

4. The spatial planning system must recognise environmental limits, whilst at the same time, robust action taken on demand management, greater efforts are directed towards leakage control and water-efficient design is integrated into housing and industry.

5. Where new resources are developed, these must be linked to demand and leakage controls and be demonstrably necessary to secure public water supply.

6. Where water storage schemes are required, damage to existing nature conservation interests must be minimised, and the benefits for wildlife maximised, including reductions in abstraction in environmentally sensitive areas.
**WATER MANAGEMENT: EVIDENCE**

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**INTRODUCTION**

7. The RSPB works for the conservation of wild birds and their environment. We are Europe’s largest wildlife conservation charity, with over one million members. We manage one of the largest conservation estates in the UK, totalling more than 125,000 hectares, including extensive freshwater and coastal wetland habitat. We provide advice on the management of wetland habitats, and contribute to the development of policy on a wide range of water policy issues including water resources, biodiversity, water quality and flood defence.

8. Wetlands are fragile ecosystems, dependent on the way water is managed, and much remains to be done to achieve sustainable water management. Movement is needed towards a system of water resource management that allocates abstractions strategically to maintain supply and prevent environmental damage, whilst actively promoting the efficient use of water.

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**What are the causes of the current problems of water supply, and how serious are they?**

9. During 2004–05 England and Wales had its second lowest November to May rainfall since 1943–44 (and in parts of southeast England, since 1904). River flows were notably low over large areas, dramatically so where much of their flow relies on groundwater. This is because a large part of southern England’s chalk aquifer received less than 40 per cent or less of the long-term average recharge over the November to May period. In late September 2005, groundwater levels in Sussex and parts of Kent remain below those recorded in the severe droughts of the 1990s, and in some places below levels recorded in 1976 (the benchmark for post Second World War drought severity). A real concern is the fear of a second dry winter, and the impacts that could have on aquifer recharge and groundwater availability in 2006. Water companies in southern England have warned that there will have to be rainfall in the order of 25 per cent more than the average between October and May, if aquifers and reservoirs are to be returned to “normal” levels.

10. This drought has had a serious impact on populations of breeding wading birds in southern England, with breeding numbers halving on RSPB nature reserves in Kent and West Sussex. After decades of declining numbers (primarily due to land drainage and associated agricultural intensification) lapwing, redshank and snipe are now largely confined to nature reserves where land and water are specially managed for their benefit. These populations are now very vulnerable to local extinctions and contraction of range.

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**What are the projections for future water supply, and what factors will influence these projections? Where, and over what timescales, may problems emerge?**

11. The UK water industry has 1,584 boreholes, 666 reservoirs and 602 river abstractions—two thirds of our water comes from surface water and one third from groundwater. In the south and east of England, this situation is reversed, with some resource zones totally reliant on groundwater. There are only very limited opportunities to move water between water companies and between resource zones. Daily abstraction output amounts to some 12,000 million litres per day.

12. Pressures are mounting on these available supplies. Recent UK water industry research suggest that up to 1,800 million litres per day of supply may be lost or restricted in availability due to the impacts of agriculture. This is just one serious consequence of the excessive use of nitrate fertilisers on UK farmland, as groundwater aquifers are contaminated and alternative sources of water have to be found to blend with the contaminated supply or to replace a lost source.

13. Climate change predictions have barely begun to be modelled thus far, with the Environment Agency claiming little impact on resource availability up until 2020 at least, but after that peak summer demand is expected to rise further, with corresponding impacts on groundwater yield and surface water availability.

14. Since the 1997 water summit (following the last “serious” drought in 1996), water companies have been required to meet leakage targets. Whilst the water loss has fallen during this period, it has recently started to rise again in a number of company resource zones. There seems little appetite for more effort in those areas where water companies believe they have achieved an “economic level of leakage” (ie going any further would result in the cost of controlling leakage outweighing the economic value of the water). Current levels of leakage are over 3,500 million litres per day (or 154 litres per property per day)—about 30 per cent of total abstraction and more than all the water consumed by metered customers.
Is the response of Government, the EU, regulators and the industry adequate?

15. The regime governing water abstraction and supply in England does not facilitate the protection of water resources. No one body is responsible for achieving reductions in water use. Consequently, England and Wales have fallen behind many other European regions in their approach to dealing with water scarcity. Daily per capita consumption rose by over 3 per cent between 2000 and 2005. In contrast, Germany’s household water consumption fell by 8.5 per cent between 1991 and 1998 while the amount of water abstracted from the environment declined by 11.4 per cent. If similar shifts could be achieved in England, then the concerns of the RSPB and similar organisations over climate change and water availability would be substantially reduced.

16. The Environment Agency is required to produce water resource strategies, balancing current and future needs and environmental impacts. However, the Agency has little influence over spatial planning and building regulations, and is further hampered by a system of permanent abstraction licences, which has prevented it achieving a sustainable abstraction regime. The 2003 Water Act was designed in part to address these problems. However, the implementation of its provisions will require firm action on the part of the Government and the Environment Agency to secure the conversion of permanent into time-limited licences. Unfortunately, the Government resisted calls for a statutory mechanism in the Act to ensure that permanent licences would be converted to time limits.

17. The water resource needs of protected areas and priority habitats are currently “safeguarded” through the abstraction licensing system (as set out in the Water Resources Act and amended by the 2003 Water Act) and its accompanying nature conservation duties. An environmental assessment is made of any licence application, and all existing licences that could potentially impact on Natura 2000 sites have been subject to the review of consents procedure (which will finally be complete in 2008). However, plans recently revealed by the Environment Agency (in a consultation on water charging), suggest that this whole process has been derailed by reluctance to raise abstraction charges by the amount needed, and through a rigid interpretation of the “cost recovery” basis of the charging system. This threatens to leave the majority of water dependent internationally important wetlands at risk of damage from licensed abstractions.

18. Beyond building regulations and water fitting regulations, there is little legislation in place to promote water efficiency.

19. In addition to these existing mechanisms, the Water Framework Directive offers a number of new opportunities to support more sustainable water resource management for the future:

   (i) River basin management planning should help to integrate ecological requirements into measures of water availability, thus safeguarding the water needed for water bodies to achieve “good status”.

   (ii) River basin plan “programmes of measures” could include attempts to restrain and reduce demand.

   (iii) Through protecting sources of supply, preventing contamination and increasing the quality of water bodies, the risk of losing water resources to diffuse agricultural pollution should be reduced.

   (iv) River basin management plans could help to prevent the development of new water supply that would be ecologically harmful and prevent good status or potential from being reached.

What are the options for increasing water supply, and what are the arguments for and against?

20. All water companies recently prepared 25 year water resource plans as part of the recent industry price review (PR04). Most of them have predicted large increases in domestic water consumption which, combined with the aforementioned constraints on available supply, will lead to reductions in the safety margin between supply and demand and may even lead to deficits. Therefore, many water companies, particularly those in the south and east, have proposed the large-scale development of new resources. In the south and east of England, this amounts to plans for four new reservoirs, two raised reservoirs and four desalination plants, while there are new impoundments, transfer schemes and river abstractions planned for Wales, the English Midlands and southwest England. Plans include a large new reservoir in southern Oxfordshire; the raising of Bewl Water in Kent and Abberton in Essex; and a new reservoir in Kent at Broadoak near Canterbury.
Water Company | New reservoirs planned | New desalination plants planned
---|---|---
Essex and Suffolk | Raising Abberton Reservoir | 
Folkestone and Dover | Share new Broad Oak reservoir | Small scheme at Hythe by 2019
Mid Kent Water | Enlarge Bewl Water by 2014; New Broad Oak Reservoir by 2019 | 
Portsmouth Water | New 23 ML/d reservoir at Havant Thickets in 2021 | 
Severn-Trent Water | Major new reservoir in lower Severn valley by 2025 to supply Birmingham and the Severn valley (up to 275 ML/d) | 
South East Water | New reservoir by 2015 | Desalination plant in 2007
Southern Water | Enlargement of Bewl Water by 2014 (shared output); new reservoir at Broad Oak (shared output) | Desalination plant for Sussex Coast
Thames Water | Major new reservoir in Oxfordshire (c 800 ML/d capacity) by 2021 | Desalination plant on Thames estuary by 2008; further desalination scheme by 2018
Three Valleys Water | Share Thames Water’s new Oxfordshire reservoir (10 ML/d from 2021) | 

21. Little thought appears to have been given to the critical issues of water efficiency and demand management. Studies suggest that water efficiency savings of between 30 and 50 per cent are possible in new-build houses (compared to building regulation standards) through the introduction of simple, tried and tested water efficiency and demand management measures, such as water efficient appliances, grey water recycling and rainwater harvesting.

22. The Greenwich Millennium Village, for example, has achieved savings of between 30 and 35 per cent compared to conventional housing through simple means such as dual flush toilets, efficient taps, efficient showers and grey water recycling. Gusto Homes, the winner of the Environment Agency’s 2003 water efficiency award, has achieved 50 per cent savings at its development in Newark. The Stirling Prize runner-up, BedZED in south London (built for and managed by the Peabody Trust), has so far achieved average water efficiency savings of between 50 and 60 per cent compared to average per capita consumption. Such development has to become the norm rather than the exception if supply deficits and environmental damage are to be averted.

23. Building new housing, particularly in the sustainable community growth areas, to the highest water efficiency standards (for example using 25 per cent less water than required by the current building regulation standards) would reduce demand for water by 419 million litres per day. RSPB research suggests that whilst it may be politically aspirational to ask for even greater savings (for example housing using 40 per cent less water than current norms), it is certainly technically feasible, and with volume construction, would not have to be expensive. Such an increase in efficiency would save 672 million litres per day. Any reduction in demand on this scale translates into a reduced need for extra supply, potentially saving water customers billions of pounds (it costs about £2.5 million to create a supply of a million litres per day), as well as reducing pressure on the water environment.

24. A range of impacts can be anticipated if water companies implement these resource plans. There is likely to be resistance to “sustainability reductions” to protect Natura 2000 sites and SSSIs by water companies looking at future supply-demand balance problems. This was seen during PR04, when over-riding public interest was cited as a reason for not including some schemes to reduce current levels of abstraction. (This is a position RSPB believes to be of doubtful legality, given the stringent tests contained in the EU Birds and Habitats Directives, and the ready availability of alternatives, including demand reduction and management). The regulation of river flows is also likely to increase, to support the creation and expansion of pump-storage reservoirs. This will lead to more rivers with “unnatural” and ecologically sub optimal flow regimes.

25. Furthermore, the opportunities for river restoration and floodplain re-naturalisation, essential for the achievement of good ecological status under the Water Framework Directive, will dwindle as more river lengths are regulated for abstraction. Reservoir construction and reservoir raising will inevitably lead to the loss of headwaters and floodplain wetlands, many of which may be or have the potential to be ecologically valuable.
26. In many areas, there will be great pressure on the Environment Agency to allow increased abstraction from aquifers and rivers, through new or fully utilised abstraction licences (only 30–40 per cent of licensable water is currently abstracted) and activation of drought permits.

27. Desalination technology may be a more environmentally benign source, but there are question marks over the energy required and the impact of the saline waste stream. The quality of the water in terms of taste is poor and does require additional water sources for blending.

28. An increasingly restrictive regulation of dwindling summer and winter water is likely, with priority for any available water given likely to be given to the public water supply. This may affect our ability to maintain the condition of water-dependant nature reserves and protected sites.

What are the likely future trends in water demand, and what can be done to manage demand more effectively, and to influence the behaviour of consumers and others?

29. While industrial and commercial demand for water has declined in the last few decades, average domestic household consumption has risen. While the average rise across the water companies was just over 3 per cent between 2000 and 2005, consumption in some parts of southern and eastern England has risen by 5 per cent (Folkestone and Dover), 11 per cent (South East Water), 10 per cent (Three Valleys Water), and 13 per cent (Cambridge Water). Rising affluence appears to lead to rising demand for high water consumptive “luxury” products like power showers, spa baths and swimming pools. Unless there is some regulatory or economic intervention, this trend is likely to continue, as the water industry has recognised in their modelling of future demand in their water resource plans of 2004.

30. Housing growth in the ODPM’s Sustainable Community growth areas alone could amount to between 150,000 and 301,000 new houses per year for the next 15 years, potentially an extra daily demand for water of 1,705 million litres.

31. The Environment Agency in southern England have modelled and estimated the effects of levels of housing growth on public water supplies. The results of the modeling are stark. Even with planned water resource developments, more than three quarters of the southeast’s water resource zones could be in summer deficit (many by several millions of litres per day) by 2025.

32. We believe that the potential for demand to be managed and reduced has not even begun to be exploited in England and Wales. The predicted increases in demand could be prevented and even reversed if the following actions were taken.

33. Charging by volume used (through metering) must become the accepted norm as soon as practicable, and the Government must be more pro-active in promoting metering, which it has stated it supports, but is currently doing relatively little to advance. We recommend that water meter installation should be targeted initially at water resource zones that are predicted to be in summer deficit by 2025 and/or to zones already showing environmental stress. RSPB research has shown that vulnerable groups (the poor, sick and elderly) can be protected from excessively high water bills in a situation where metering is the norm through the use of tariffs that provide a low-cost “essential use” block of water with progressively higher blocks for further non-essential use. Such a system would have the merit of providing a substantial disincentive for “luxury” use by ensuring that tariffs rose steeply on use over and above basic domestic needs.

34. The establishment of a “Water Savings Trust”, to promote water efficiency and the installation of water-efficient technologies in homes and industry should be seen as an essential companion to any adopted metering and water efficiency strategy. Water efficiency promotion to customers is currently unfocussed, fractured among a number of organisations (many with little public recognition and awareness) and ad-hoc. While there are programmes for installation of energy saving products and installation of new energy efficient products into homes, there is nothing like this in the water sector—even in drought hit and water scarce areas. A single, well-funded “Water Savings Trust” could provide a “one-stop shop” for all water customers and be instrumental in helping to raise awareness of water as a key environmental challenge.

35. We understand that research is being undertaken into a possible water efficiency labelling scheme for “white goods”. This is a superlative means of educating consumers and suppliers that operates successfully in Australia. Such a scheme should be adopted without delay.

36. We await the launch of ODPM’s voluntary Code for Sustainable Building with great interest. We hope that it can make a major contribution to making water (and energy) efficiency mainstream. We do, however, believe that to be a truly effective means of restraining demand for water, the code should be made mandatory for all new building. We understand that the code will set levels of water use at 25 per cent less than current building regulation standard homes. While this is welcome progress, it is far from the limits of what it is already technically feasible. Indeed the aforementioned water efficient developments have achieved water savings of
up to 60 per cent. The code should be regularly revised to reflect technological development and set higher water efficiency standards for areas suffering from particular water resource problems and environmental stress.

October 2005

Memorandum by Southern Water

1. INTRODUCTION

1.1 This submission is made on behalf of Southern Water and reflects the agreed positions of the company on the issues the committee is currently examining.

1.2 Southern Water welcomes the opportunity to submit a summary of views on water supply management. Southern Water recognise that there has been much recent interest in water supply issues and the position of the Water industry in relation to these. With extensive experience in the water utilities sector, Southern Water put forward this submission and look forward to an engagement with members of the committee and others in the hope that a broad consensus can be developed about future water resource issues in the southern region of England.

1.3 Southern Water provides water supply and wastewater treatment services across Kent, East and West Sussex, Hampshire and the Isle of Wight. Although the company treats all of the wastewater in the region, it’s water supply appointed areas are much more fragmented (figure below).

1.4 The company treats wastewater from approximately four million customers and provides clean drinking water to just over two million customers. Typically we would expect to supply on average over a year some 620 million litres of water per day to our customers. However during the summer months this can increase to 827 million litres per day as activities such as garden watering increase the consumption of water.

1.5 Southern Water abstracts water from some 200 boreholes, and nine surface water sources, with a volumetric split of 70 per cent from groundwater and 30 per cent from surface water. The dependence on groundwater is a unique feature of the South East compared to other water companies across Britain, who typically are either entirely or predominantly surface water based.

1.6 Since 1996 leakage levels in our water resource zones have decreased from 113 million litres per day down to 92 million litres per day. Typically 30 per cent of the water lost in the system is from customer supply pipe leakage. In addition to leakage reduction the company has been promoting the water efficiency message to its’ customers. Although the savings from the promotion of the water efficiency message are harder to quantify, the per capita consumption of our customers has not shown any significant increase in the last 5 years.
2. Defining the Problem

2.1 What are the causes of the current problems of water supply, and how serious are they?

2.2 The current problems facing the Southern Water, in particular our Sussex and Kent supply areas, are a consequence of the drought which developed last winter after only 56 per cent of the rainfall we would normally expect fell across the counties. This was the second driest winter we had experienced in our Sussex zones since 1904. The driest winter period was observed over the 1975–76 winter.

2.3 Winter rainfall is key to water companies, particularly groundwater based companies, because it is the period in which our groundwater and reservoirs refill. It is also important for many of the groundwater fed rivers in the region, as they depend on the groundwater aquifers to support the flows during the summer and autumn months.

2.4 Rainfall during the summer months does very little to increase the amount of water available to supply customers as this rainfall either evaporates or is taken up by plants before it can recharge groundwater sources or reservoirs. Rainfall during the summer will help to suppress peak summer demands, which are typically caused by customers using domestic drinking water to water their plants.

2.5 The current groundwater levels are already beginning to hit all time minima and some river flows have also reached historical minimum levels. To bring groundwater levels back up to normal (average) levels by the end of the winter period the South East of England will require 125 per cent of average rainfall each month from September to March. Weir Wood, an impounding reservoir, will require at least average rainfall each month from September to March, whereas the pump storage reservoirs will require at least 80 per cent average rainfall each month to ensure they are full. Therefore, all thoughts now turn to this winter and the amount of recharge we will receive.

2.6 If this dry spell continues into next year then this drought will become one of the most severe on record in the South East. However, this raises the issue regarding what level of drought do you plan for in the water resource plans.

2.7 Up until 1995 Southern Water used to plan for a 1:50 year drought on both its groundwater and surface water systems. However, with the introduction of new methodologies by the Environment Agency for determining the yield of sources in extreme droughts (often referred to as the deployable output of a source) the level of severity that we now plan for surface water derived sources is different to groundwater sources. Typically we now plan for more severe droughts for our surface water sources than our groundwater sources. With 70 per cent of the water supply in the South East being derived from groundwater this creates some difficulties compared with the rest of the country, which predominantly derive most of their supplies from surface water. Therefore, we feel that there is a need to plan on a consistent basis for both groundwater and surface water.

2.8 Another aspect of the surface water yield methodology is that it will use past historical rainfall sequences (typically back to 1920) to define the drought yield of a system. Although this approach allows us to test the sensitivity of different surface water systems to different droughts it prevents us from looking at the sensitivity of the same systems to other types of droughts and here lies the flaw in the methodology. Past drought events will not repeat themselves in the future. Similar droughts may occur but they will not be the same. Some surface water systems may not be sensitive to droughts of differing durations or intensities, but other may be. It is important to define the reliability of sources to drought events different in nature if robust systems are to be designed to cope with future climate.

2.9 What are the projections for future water supply, and what factors will influence these projections? Where, and over what timescales, may problems emerge?

2.10 Water companies produce 25 year plans that set out its strategy to ensure there are sufficient resources to meet the expected demands of our customers. The Environment Agency developed the methodology currently used by the industry. Simplistically, the method sets out an approach that compares future demands against the deployable outputs of the sources. When the future demands exceed the available supply then an intervention strategy is required.

2.11 The intervention strategy that is chosen can be either to develop a new resource or reduce future demands. In some circumstances the final solution can also be derived from both. The solution that is chosen is based on the finding the most cost effective intervention strategy to solve the supply demand balance problem. Figure 1 below shows future demands (turquoise line) exceeding drought outputs (light blue area) requiring a new resource to be developed (dark blue shaded area) in 2017.
2.12 The future demand for water is based on a number of factors, the main components of which are housing growth numbers, commercial and industry growth, occupancy rates, per capita consumption and meter penetration rates. Issues such as the housing growth rates are taken from a variety of sources such as the local council plans (1 to 5 years) and the government economic forecasts for growth in the South East (5 to 25 years). Other factors surrounding the population growth rates such as birth rates, death rates, economic growth rates and migratory patterns are take from various government and economic forecasts.

2.13 Over the next 25 years this will require Southern Water to develop additional sources of water, increase meter penetration and continue with our water efficiency program. However, there are several conflicting issues that are going to affect future water supply and as yet these have not been resolved:

2.13.1 Housing development in the South East this will increase the demand for water and will require new resources to be developed. Although the high level housing numbers have been agreed the spatial resolution of these numbers still has to be resolved.

2.13.2 The outcome of sustainability investigations driven by the Habitats directive has not featured in our current resources plan, due to the uncertainty of the issues. However the results of these studies may indicate that it is necessary to reduce the volume of water abstracted from a source. In this scenario this will reduce the water resource zone into a supply demand deficit, which of course would lead to an intervention strategy needed to be developed.

2.13.3 Climate change will impact on water companies both directly and indirectly. Direct effects will be seen at our sources and our customers’ demand for water. Current predictions of the impact of climate change on our sources are still being investigated. Early research has shown that we would anticipate that the yield of our surface water reservoirs will marginally improve whilst our groundwater may marginally suffer from shorter recharge seasons. With regard to our customer demands we would anticipate these to increase in the summer months due to garden use.

2.13.4 Regulatory guidance. Any change to the regulatory framework or economic forecasts can affect either side of the supply demand balance equation (as described earlier). This in turn could drive investment for future intervention strategies.

2.13.5 Consumer behaviour may demand higher levels of service in the future. For example we currently plan to impose a hosepipe ban on average every 10 years. Any change in this policy will impact on the supply demand balance.
2.14 Within the South East of England we anticipate that the future housing projections can be accommodated as long as companies are allowed to develop additional resources and infrastructure in advance of the houses being built. For Southern Water we anticipate that we will have to put an additional 66 ML/d. This increase in the demand for water is predominantly driven by the South East housing plan. This assumes that the local planning authorities grants planning permission for the strategic developments, such as the construction of a reservoir, which will provide benefits for many people outside the local community it is developed in. Sometimes these strategic developments will fall across several planning authority boundaries and therefore several applications will have to be granted to allow the development to take place.

2.15 Legislation aimed at ensuring that abstractions are sustainable could potentially impact on public water supply sources. Investigations are being undertaken by water companies and the Environment Agency into what might have to be developed to accommodate the results of the Habitats directive, ALF and CAMS. In the future additional pressures might also come from the Water Framework Directive.

2.16 Is sufficient research being devoted to predicting, and handling, possible future scenarios?

2.17 Research within the industry is undertaken in one of three ways, either:

— the industry undertakes or commissions its own individual research functions. Typically this research is focused on the individual intervention strategies for each of the companies; or

— collaborative studies sometimes with the regulators are commissioned. These type of studies are aimed at national generic studies which will provide policy or best practice guidance to the industry;

— research undertaken by third party specialists is used by the industry to help inform the future supply demand balance equations. A typical example of this is climate change in which the industry takes the results from the UKCIP work and uses it to predict the impact on its sources and customer demands.

2.18 Research and development of the products that the industry uses is driven by competition as the industry tries to ensure new technologies are taken on board. For the industry to continue to become more efficient it will require new innovative products to be developed, which will in turn require its suppliers to continue to develop innovative solutions taking on board new technologies.

2.19 Is the response of Government, the EU, regulators and the industry adequate?

2.20 Currently a large amount of research is being undertaken into various aspects that impact on the industry. However, there may be several conflicts of interest that arise from the research which are not being co-ordinated and resolved at a national level. For example a tremendous amount of research is being undertaken to investigate the consequences of climate change impacts and yet when we look to create sustainable Habitats for the future it is based on current ecosystems. Therefore we could create the correct habitat for target species to thrive only to see the impacts of climate change drive the target species away from the habitat.

3. Supply and Demand

3.1 What are the options for increasing water supply, and what are the arguments for and against?

3.2 There are a number of options that are available for increasing water supply, currently we have some 160 different options in our water resource plan that we consider when the plan is derived. These include such schemes as transferring water from Scotland, Wales or France (through the channel tunnel); towing ice bergs; aquifer storage and recovery systems to improve groundwater recharge, as well as the more traditional solutions of reservoirs and desalination. The table below outlines the uncertainties, constraints and opportunities for resource development schemes at a generic level and is taken from the Environment Agency’s report on Water resources for the future. More specific details of the schemes Southern have investigated could be submitted if required, the report is some 100 pages.
<table>
<thead>
<tr>
<th>Option</th>
<th>Type</th>
<th>Time to implement [yr]</th>
<th>Renewal period [yr]</th>
<th>Uncertainties</th>
<th>Constraints</th>
<th>Opportunities</th>
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<td>Greywater use (new development, non-potable)</td>
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<td>10+</td>
<td>-</td>
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1 Pumped storage = high, gravity = low  2 Low to Medium  ● High  ○ Medium  ● Low
3.3 What are the likely future trends in water demand, and what can be done to manage demand more effectively, and to influence the behaviour of consumers and others?

3.4 We are currently predicting that future demands for water will increase due to the proposed increased housing growth in the South East. The savings from current and future water efficiency and metering strategies will not offset this growth in demand. These strategies will help to restrict and even curb the growth in per capita consumption, but this is all.

3.5 There are three inter-related aspects of future demands. The first relates to how many new houses will be developed in the region. The second relates to how customers use water. This can of course be influenced through metering. However, this is the only aspect in which a company has powers to install a device that can directly influence customer behaviour. Other white good products and water efficient fittings can only be regulated and at the end of the day it is down to consumer choice whether they are bought. The third aspect relates to customer behaviour towards water.

3.6 Water efficiency campaigns began in 1996. Southern has viewed these campaigns as a long-term strategy to influence the future use of water within the home, in particular not to waste water. Customer behaviour will not change overnight and sometimes it also requires legislation to help force certain aspects of water efficiency into the house. For example the recent improvements to building regulations have ensured that lower flush toilets are to be used in the future. However, we feel that these regulations should continue to be reviewed to ensure that higher water efficient fittings are introduced into the new and existing housing stocks when possible. This will help to continue to stabilise and even drive down per capita consumption in the future.

3.7 A central feature of the short-term demand forecast is Southern Water’s approach to water efficiency. The essential elements are:

3.7.1 Reducing Toilet Flush Volume: Toilet flushing accounts for a third of the total domestic demand. Cistern devices were sent out to all customers in a programme completed in 2000. As a short-term demand measure, we continue to provide further devices on request, but do not envisage major unsolicited mailing programmes. A more promising and robust mechanism for reducing flush volume in older toilets are retrofit variable (or “dual”) flush systems, for the installation of which a relaxation has been recently granted by DEFRA. These devices were shown to decrease flush volume by up to 27 per cent, and reduce total domestic demand by as much as 8 per cent. We will also step up the promotion of new water efficient 4 litre flush toilets.

3.7.2 We will continue to promote water audits for businesses and schools and we intend to continue a close working relationship with local authorities and the Environment Agency on promotion of water efficiency in public buildings and schools. In addition we will also continue working with Envirowise and other organisations on further promotion to businesses.

3.7.3 Throughout the current planning period we plan to continue with our free supply pipe repair policy. Free replacement of leaking lead pipe work up to 10 metres in length will also continue to be available as an added input into the water quality initiative.

3.7.4 A major part of the strategy focuses on information and education of customers. Although difficult to quantify in volumes saved, it helps to raise the profile of water efficiency as a valid and important issue to both adults and children, and is a necessary and important component of the overall water efficiency programme. Under our current programme, we will continue promotion of water efficient gardening to customers.

3.7.5 Water butts can save around 1,000 litres of water per butt per season, and are very popular with gardeners. A customer survey conducted in 2002 shows that 33 per cent of unmeasured, and 42 per cent of measured customers in Southern Water’s area already own a water butt. We have continued to promote our mail order water butt service and have also organised the occasional one-day sales. Promotion of water butts will remain a part of our water efficient gardening strategy.

3.7.6 The current Research and Development programme will continue in an effort to identify and quantify viable water efficiency measures. We will continue with the current trend for joint projects with other water companies in order to increase the robustness of data and facilitate exchange of information.

3.8 Southern Water is proud of its efforts to reduce leakage over the past years to its current position of one of the best companies in the country, and we continue to meet the leakage target set by Ofwat, and prides itself on its achievements to date.
3.9 The table below shows companies’ leakage performance between 1999-2000 and 2003–04. It can be seen that SW has continued to improve on the amount of water lost through leakage per property per day. It has the lowest leakage rate for all of the Water and Sewerage companies, the third lowest in the entire industry and is well below the industry average of 154 l/prop/day.

**Company Estimates of Total Leakage (l/prop/day)**

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</table>

Ref: OFWAT: Security of supply, leakage and the efficient use of water

3.10 In reviewing our leakage targets with OFWAT during our recent business plan review it was concluded that the company is at its current economic level of leakage. Therefore we have not sought to drive leakage down any further than the current target level. However, it should be recognised that although the current absolute target is not altering the leakage rate per property is dropping as more houses get connected onto the network.

3.11 As new and innovative technologies are developed these will help to continue to promote water efficiency and also help detect leaks quicker and earlier, both of which will help to continue reduce the demand for water in the future.

3.12 What contribution can science, engineering and technology make towards reducing water use or waste by households, businesses and the public sector?

3.13 Science, engineering and technology will play an important role in the future by driving down the volumes of water that is wasted and by also providing technologies to recycle more water, where it is safe to do so.

3.14 New consumer products such as washing machines, dishwashers, toilets, taps, etc require further development to ensure that they are water efficient, ie they use the minimum amount of water to ensure that they undertake their function. Good advances have been made with toilets for example with dual flush systems and now a 4 litre flush toilet has been developed. Progress is also being made with domestic white goods, which
again has seen the amount of water used by washing machines and dishwashers decrease over the years. We feel that if these types of initiatives are to be encouraged to continue the industry should label products as being water efficient, along the lines that the power industry currently does.

3.15 Advances in leak detection technology is also improving and within Southern we use a variety of techniques to detect leaks and as new innovative technology comes onto the market the companies will investigate, trial and if successful include into our own leakage detection teams.

4. INFRASTRUCTURE

4.1 What is the current state of the water supply and drainage infrastructure?

4.2 The current infrastructure within the water industry has evolved and grown, just as towns and cities have developed based on the geographical layout of the sources. As villages, towns or cities have grown so has the need to connect various supply zones together to ensure that there is sufficient supplies.

4.3 The water supply infrastructure has also been set up around traditional yields of sources in so much that links between sources will not always be sized to cater for a complete loss of a source. However, as changes in climate start to impact on the yields of sources it may become necessary to review key infrastructure links to take into account the greater variability shown by the climate.

4.4 Likewise with the drainage network, which is typically a combined wastewater and drainage system, has again evolved as communities have grown. The sizing of these networks is designed specifically around a certain storm event eg a 1: 50 year storm. The regulators will allow the water companies to improve their infrastructure networks where there is a need to do so, however the capacity of the system will always be based on a certain design criteria.

4.5 Is there sufficient investment in its improvement?

4.6 OFWAT looks for companies to maintain their infrastructure networks and has built up a number of high level regulatory targets to ensure that the service provided to customers is maintained at a suitable level.

4.7 Within Southern region this has resulted in some improvement in our water supply networks but at a rate that we currently feel is inadequate. We are currently working with the regulator to try to improve the replacement criteria.

5. CONTEXT

5.1 The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at national and European levels, adequate?

5.2 The current legislative framework has been derived to answer specific issues within the industry regarding sustainability. However, the regulators do not always have the necessary legislative powers to ensure that the full range of recommendations is enacted upon. For example a habitat directive review of a particular designated site may require the abstraction licence of a source to be changed. This may be one of a number of measures that will be required to bring the designated site back into favourable status. However, the legislative framework will often only permit the regulators to enforce a change to an abstraction licence and not the other measures therefore although one aspect may be altered it may not be sufficient to achieve the goal of the directive. It should also be remembered that it is not always an abstraction that has the biggest impact on a designated site.

5.3 Sometimes conflict between legislation and government policy can also occur when solutions are derived. For example a loss of a major resource due to an abstraction licence being changed could be replaced by another source such as desalination which will use a lot more power and be at odds with the governments policy on CO2 generation.

5.4 How does water figure in the development of Government policy in areas such as housing, land use planning and industry?

5.5 Water is seen by areas of government as a key to the regeneration of certain areas of the country and they also recognise the need to ensure that infrastructure is developed before a new development comes on line. However, without the spatial resolution of the housing growth plans it is difficult for the industry to ensure infrastructure developments are implemented in a timely manner. The key to growth is to allow sufficient time to implement improvements.
6. CONCLUSION

6.1 Science and technological research will always continue to play a key role for the industry as it strives to produce solutions to the sometimes competing aspirations of policy and legislation in meeting the demands of our customers in the future. More work needs to be undertaken within the industry, but there is also a need to ensure key pieces of research such as climate change are driven nationally as it has so many implications for a broad range of industries.

6.2 Through technological advances in the future the demand for water should drop, in so much that water wastage should decrease and recycling technology should come to the for. However, whilst we operate in an economic climate that drives innovation and technological advances to become more efficient, customers are struggling to invest in this type of technology when the pay back period of such investments are not realised within a short period of time. If the price of water remains the key driver for the introduction of new technologies outside the water industry then even at today’s prices we do not see customers changing technologies to generate further savings. At best we observe companies changing technologies when there are other economic drivers other than water efficiency.

October 2005

Memorandum by the South West Climate Change Impacts Programme (SWCCIP)

1. The South West Climate Change Impacts Programme (SWCCIP) is the regional partnership helping to investigate, advise and inform on the impacts of climate change in the South West across a range of sectors.

THE IMPACTS OF CLIMATE CHANGE ON WATER MANAGEMENT

2. The SWCCIP has a utilities sector group that is exploring how climate change will impact areas such as water management, in the South West. The South West’s geography, popularity as a tourist destination and with more than two thirds of the land area supporting agricultural production, these factors present challenges for water management in a changing climate.

3. Climate change is potentially the most serious problem affecting water resources in the longer term and the one with the most uncertainty attached to it. The SWCCIP’s scoping study “Warming to the idea”7 outlines in detail the impacts of climate change on water resources, in terms of challenges and opportunities. The key issues for water management in the South West, as a direct result of climate change, can be divided into seasonal climate impacts and the subsequent challenges and opportunities arising from those impacts.

4. The UK Climate Impacts Programme climate scenarios suggest that the South West will experience drier summers with higher summer temperatures. This presents a number of challenges, including increased evaporative losses from surface water stores, an increased risk of water demand rises leading to reservoir draw down and an increased risk of algal blooms and eutrophication in reservoirs containing reduced water levels and low inflows.

5. These factors could lead to a likely reduction in deployable output. Using the results of the UKCIP 2002 scenarios8 a recent UKWIR report9 indicated that by the 2020s the reduction in the late summer mean river flow could be as much as 42 per cent, assuming a medium emissions scenario. Computer models of the region’s water resources system show that these changes in river flow translate into a significant loss of deployable output.

6. The reduction in river flows will lead to poorer water quality, as there will be less water available for dilution and therefore increased stress on the aquatic environment. This in turn is likely to lead to tighter environmental authorisations (abstraction licences and discharge consents) and therefore further reductions in deployable output.

7. Many water companies are experiencing increasing problems with the eutrophication of reservoirs. This is expected to get worse over the next 5 to 10 years and is largely the result of agricultural run-off flowing into reservoirs. Eutrophication causes the production of excess water treatment works sludge and can, in extreme cases, result in reservoir water being virtually un-treatable by normal means and too polluting to be released into a river. This leads to increased operating costs and a reduction in deployable output. The higher temperatures that are projected from climate change will exacerbate these eutrophication problems, as some algae will be able to over-winter. One way of reducing eutrophication is to install destratification schemes at

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7 Warming to the idea, January 2003 www.oursouthwest.com/climate/scopingstudy.htm
8 Climate Change Scenarios for the United Kingdom, Tyndall Centre and Hadley Centre, April 2002.
9 Effect of Climate Change on River Flows and Groundwater recharge: UKCIP02 Scenarios, UKWIR Report Ref No 03/CL/04/2.
vulnerable reservoirs that pump air into the water and produces a mixing effect. However they require the use of energy, the cost of which can be expected to increase as fossil fuel dependency reduces.

8. The changing climate is also expected to bring an increase in winter rainfall. This impact could result in increased run-off, which can lead to over-stressing and backing up of the sewer network. There are also problems associated with the transfer of sewage sludges to agricultural land though difficulty in spreading and land access and an increased potential for nitrate flushing into water stores and courses. Increased winter rainfall could also lead to further soil erosion and sedimentation. Yet rising winter rainfall could also bring potential opportunities for water management in the South West, with greater potential for increasing water releases for hydropower and greater potential for one-season recharge of larger reservoirs and aquifers. Incidents of flooding are also expected to rise with climate change, which could result in the potential over-loading of sewage treatment plants, over-stressing and backing up of the sewer network. Water distribution may also be adversely affected by localised flood events.

9. Rising sea levels may reduce the deployable output of both surface water and groundwater sources. Major river intakes are often placed as close to the tidal limit as possible in order to benefit from the maximum catchment area. If sea levels rise, it is possible that some of these intakes will be in brackish water. There is potential for saline incursions into water abstraction plants near river mouth (eg Exeter) as well as the potential for saline incursions into groundwater abstraction boreholes (eg Dawlish), both of which will affect the deployable output.

10. Whilst the impacts of climate change on the South West may present an opportunity for a longer growing season, this could lead to more intensive land use and greater incidence of winter ploughing, with associated sediment erosion into reservoirs and storm sewers.

11. The climate has already changed over recent decades and will continue to do so at an increasing rate, yet the nature, timing and extent of necessary adaptation to our changing climate is not yet well understood. There is a need to develop and disseminate sector-specific information and advice for businesses and organisations that emphasise the ‘must dos’ and mechanisms are needed to ensure that lessons learned are promulgated widely. The SWCCIP aims to help investigate and deliver the necessary solutions to enable the South West region to adapt to climate change.

October 2005

Memorandum by United Utilities

SUMMARY

1. United Utilities PLC (UU) supplies water to 6.6 million people and some 200,000 non-household customers across North West England. We also manage wastewater and water operations in Wales for Dwr Cymru/Welsh Water and wastewater treatment facilities in Scotland. As one of the largest providers of water and wastewater services in the UK, UU welcomes the inquiry by the House of Lords Select Committee on Science and Technology into water management.

2. The UU region has an adequate supply-demand balance and as such is in a middle position compared with other water companies: we are not water scarce, nor do we have surplus water supply. UU is recognised by Ofwat and the Environment Agency as having a detailed and robust understanding of supply-demand issues. For these reasons UU is well place to contribute to the inquiry.

3. The key points that we consider should be placed before the Select Committee are set out in this document and are summarised below.

4. Occasional non-essential water use restrictions and publicity about possible water shortages are part of prudent water resource management plans. Therefore it is to be expected that hosepipe bans and other actions have been needed in some parts of the country as a result of the very dry weather over the last 12 months. Large-scale supply or demand solutions would be required to avoid hosepipe bans in severe droughts. These would incur large costs and environmental implications, which would outweigh the customer impact of occasional bans in such conditions, as confirmed by customer research.

5. UU currently has an adequate supply-demand balance, but expects large future reductions in water availability, potentially around 15% of current supply capacity, due to climate change (forecast at 10% reduction) and nature conservation reviews of abstraction licences (5%). Significant investment is likely to be necessary over the next 10 years or so to avoid more frequent water restrictions in the future, and should be recognised in the next review of water prices in 2009. The water supply needs in South and East England are even greater.
6. The largest risk to water supply in the longer term is climate change. UU has identified that the impact of climate change on water source yields could potentially amount to 200 million litres per day by 2025 (based on three main climate change scenarios), which represents 10% of our current total supply. Replacement of this magnitude of lost water yield would require the construction of a very large new reservoir, or an equivalent combination of large-scale supply and demand solutions.

7. Maintaining an adequate supply-demand balance in the future requires implementation of an optimal combination of supply enhancement and demand management measures. The scale of expected deficits is such that demand-side options alone cannot meet the need.

8. UU and the rest of the Water Industry are committed to the “twin-track” approach of maximum use of economic demand management measures together with prudent development of water sources to achieve adequate supply-demand balances at least cost and environmental impact. The selection of the optimal combination of supply-side and demand-side solutions is based on economic appraisal of available options to achieve the right balance between supply reliability, environmental impact and affordability of water charges. We welcome the announcement by Water UK concerning the establishment of “WaterWise” to promote further demand-side actions.

9. In particular, water companies are committed to programmes to achieve and maintain the economic level of leakage, derived using the methodology prepared by Ofwat, the Environment Agency and Defra. Water companies operate large water networks with very large numbers of pipe joints and connections, each of which provides an opportunity for seepage of water. Most of the leakage that occurs comprises a large number of very small leaks that are not visible and are dispersed across the network. Such leaks are very difficult to locate. Water company leakage programmes are focussed on finding and repairing detectable leaks as quickly as possible. Further leakage reduction, beyond economic levels, is achievable to a limited degree, but only at significant additional cost.

10. The following programme of actions is required to prevent more severe water shortages in the future:

(a) Defra, the Environment Agency and other regulators should more strongly signal their acceptance that supply enhancement schemes will be required, alongside efficient demand management measures, to ensure adequate water availability in the future. This includes new reservoirs or other water sources, where these are demonstrated to be cost effective and with acceptable environmental impact. In North West England the development of groundwater sources, particularly in areas of rising groundwater, often provides the most economic and environmentally acceptable solution to resolve supply deficits.

(b) All parts of the water industry should continue to actively promote and support further research on leakage control and water efficiency measures to identify and develop new, more cost effective measures than currently available. UU, like other water companies, is implementing an extensive range of demand-side options including leakage reduction, customer metering and promotion of water efficiency, wherever economic. However, currently available demand-side options and technologies are often either very expensive compared with supply-side options or save small quantities of water. There is a need to find more efficient and reliable demand-side measures.

(c) Further regulation on water-saving appliances is required to ensure that all new domestic appliances are very water efficient. Also all new private and public developments should explicitly include water efficiency measures in their design. These are very important measures to ensure that future water use is minimised. The cumulative impact over several years would be substantial.

(d) A coherent national strategy concerning the extension of household metering is required, as it is not clear what Government’s long-term plan is. The strategy should include measures to accelerate metering of customers and making approval of compulsory metering programmes much easier. Although the need for and benefit of metering is much less in North West England compared with the South East, a national strategy is needed which clarifies the long-term plans for metering across the country (with regional variations), and enables universal metering in areas of greatest need.

(e) Water companies were disappointed that proposed water efficiency measures submitted as part of the 2004 water price review were (with a few minor exceptions) excluded from price limits by Ofwat. There is a need for Ofwat, the Environment Agency and water companies to work closer together to agree the need and funding for water efficiency measures.

(f) The Water Industry should continue to adhere to the current and well-established methodologies to assess the economic level of leakage. This is well regulated by Ofwat and control of this measure should not be transferred to other regulatory authorities who are not accountable for assessing the impacts on customer bills.
(g) UU together with the rest of the water industry has actively supported climate change research, which is resulting in substantial improvements in the understanding of how climate change will impact on water supply. We expect to be able to include explicit allowances at the next review of water prices in 2009. However, further research is required to further improve the accuracy of predictions and reduce the range of predicted potential impacts.

(h) Defra and other regulators need to ensure that at the next review of water prices in 2009, full recognition is made of the effects of climate change, abstraction licence changes for nature conservation and housing growth, and of the consequential investment needs to ensure adequate supply-demand balances in the future.

(i) There is a need for joined-up regulation by regulators on implementation of nature conservation legislation to ensure timely identification of needs and provision of funding.

What are the causes of the current problems of water supply, and how serious are they?

1.1 Over the last 12 months many parts of the UK have received much lower rainfall than average. This has resulted in significantly less water available in reservoirs, rivers and groundwater than usual. Dry weather also stimulates additional demand for water, in particular for watering of gardens. The actions taken by water companies to publicise awareness of the need to conserve water, and in some cases impose hosepipe bans, are part of their prudent water resources management plans to ensure adequate water supplies for future months.

1.2 Water companies have a key responsibility to maintain a satisfactory balance between supply and demand for water. In securing an adequate supply of water to meet current and future demand, companies have to strike a balance between:

- Customer and society’s need for a highly reliable, good quality service;
- Affordability (as expressed by the level of expenditure required and the consequent impact on customer water bills);
- Environmental impact and protection (e.g. abstraction affecting river flows; discharges of treated sewage effluent affecting aquatic ecology); and
- Achievement of statutory and regulatory requirements (for example, the EU’s Habitats, Birds and Water Framework Directives).

1.3 Occasional non-essential water use restrictions (such as hosepipe bans) are part of achieving this balance and ensuring that we do not run out of water under the most severe conditions on record. Large-scale supply or demand solutions would be required to avoid hosepipe bans in severe droughts. These would incur large costs and environmental implications, which would outweigh the customer impact of occasional bans in such conditions, as confirmed by customer research.

1.4 UU’s investigations have identified that, for our region, the best level of service involves a hosepipe ban frequency of once in 20 years. This represents the best balance between customer expectations for security of water supplies and the costs and environmental impact associated with the provision of higher standards of service. UU has adequate supply-demand balance to achieve this level of service and does not expect to implement water restrictions during 2005.

1.5 Our drought management plans, which are agreed with the Environment Agency, include a range of actions to be taken as various defined trigger points are reached. For example Figure 1 shows the trigger levels for drought management actions according to the storage remaining in Haweswater Reservoir, which is the largest water source in North West England—these trigger levels vary according to the time of year. One of the actions that we undertake in the event of prolonged dry weather is enhanced publicity to encourage customers to reduce their water consumption—this occurs several weeks or months before the need for any water restrictions may be required. As a result customers are aware of the possibility of drought conditions more often than hosepipe bans are actually required.
Figure 1. Example of Drought Management Triggers
(for enhanced operational actions, publicity actions, and applications for hosepipe ban or other drought powers)

1.6 Therefore, occasional water restrictions are to be expected, together with publicity about possible restrictions on a more frequent basis. UU has adopted an appropriate level of service, based on customer research and evaluation of economic and environmental implications. If a lower frequency of water restrictions is required by society, it will require additional costs on supply enhancement, demand management and environmental impacts.

What are the projections for future water supply, and what factors will influence these projections? Where, and over what timescales, may problems emerge?

1.7 We expect water availability at existing water supplies to reduce significantly in the future due to the effects of climate change and of environmental legislation (see Figure 2). These will result in more frequent and more severe water shortages unless action is taken to accept and fund substantial supply-demand solutions. In other areas, most notably South and East England, supply needs will also be significantly affected by growth in housing and population.

1.8 The largest risk to water supply in the longer term is climate change. UU has identified that the impact of climate change on water source yields could potentially amount to 200 million litres per day by 2025 (based on the average of three main climate change scenarios), which represents 10% of our current total supply. Replacement of this magnitude of lost water yield would require the construction of a very large new reservoir, or an equivalent combination of large-scale supply-side and demand-side solutions.
The effects of climate change include:

- Reliable supply from water sources may reduce due to more severe droughts.
- Level of service for hosepipe ban frequency may deteriorate due to more frequent droughts.
- Demand for water by customers may increase in hotter summer periods.
- There may be greater pressure to reduce abstraction to protect the water environment due to an overall lowering of river flows/groundwater levels.
- Water quality in reservoirs and rivers may be affected by higher temperatures and lower dilution, with consequent impacts on water treatment.
- Water quality in reservoirs and rivers may be affected by more severe storm events and greater soil runoff, with consequent impacts on water treatment.
- More frequent storm damage may occur to water supply assets.

In the absence of investment to expand or develop new water sources, reliable supply is generally forecast to reduce in all parts of the country over the next 5–15 years as a consequence of abstraction licence reductions. These will result from environmental legislation (including the EU’s Habitats, Birds and Water Framework Directives), and the Environment Agency’s abstraction management policy requiring reviews of water company abstraction licences. For example, in North West England 60 per cent of UU’s supplies are derived from sources in sites designated under the Habitats Directive, and there is a risk that reliable supply may reduce by 50 million litres per day (ie 2.5 per cent of our current total supply) as a result of implementation of the Directive by 2010. Further reductions in supplies due to other licence reviews, particularly driven by the Water Framework Directive, are expected in the longer term.

Pollution of water sources, especially arising from agricultural practices (nitrate, ammonia and pesticide runoff into surface water and groundwater), may also lead to the closure of some water sources in the future due to treatment costs becoming prohibitively expensive.

Is sufficient research being devoted to predicting, and handling, possible future scenarios?

Climate change is the largest risk in water resources planning because of the current uncertainty in the predictions and the very large impact that is expected. A lot of work has been carried out, and is continuing, by UK Climate Impacts Programme (UKCIP), UK Water Industry Research (UKWIR), the Environment Agency and other research organisations to define climate change scenarios and their impacts for the water industry. Water companies have applied a standard range of scenarios in our modelling of climate change
impacts on water supply availability. We are concerned to reduce the uncertainty about the climate change predictions to enable adequately robust investment decisions.

1.13 UU is therefore strongly supporting current further research in particular through UKWIR and the Environment Agency to increase confidence in the predictions. We have been actively involved in various studies including the following research programmes over recent years:

- UKWIR project CL04B: “Climate change scenarios for water resources planners at the resource zone level”.
- UKWIR project CL04C: “Effect of climate change on river flow and groundwater recharge—a practical methodology”.
- Environment Agency project on “The Impact of Climate Change on Severe Droughts” which also involves Anglian Water.
- EA-led “SWURVE” project on UK hydrological impact.
- Defra project “Climate Change Impacts and Adaptation: Cross Regional Research Programme”
- Defra project “Climate Change and the Demand for Water”
- Defra funded project “Regional Impacts Study 2” that builds on the previous “Regis” project.
- UU is an active member of the Northwest Climate Group, which promotes research and publicises information about the impact of climate change on various sectors

1.14 Current research through UKWIR and others will greatly help, but more work is needed to further improve the accuracy of predictions and reduce the range of predicted potential impacts.

Is the response of Government, the EU, regulators and the industry adequate?

1.15 In addition to water companies, central and local Government, the water industry regulators (Ofwat, Drinking Water Inspectorate and Environment Agency) and environmental bodies (such as English Nature), all play a key role in determining policy and influencing supply-demand investment. It is therefore important that there is joined-up policy and regulation. Closer integration between these public bodies is still required to achieve a sustainable supply-demand position across the UK, in particular:

(a) There is a need for Government and regulators to agree on the explicit inclusion of supply-demand investment arising from climate change impacts in water pricing reviews. The next review is in 2009. This is essential to ensure that water companies can implement actions in time to avoid more severe water shortages in the future. Whilst it will not be possible to determine precise impacts, measures to increase the resilience of water supply systems to climate change will be needed in the medium term (next 10 years).

(b) There is a need for joined-up input by regulators on the scoping and funding of environmental improvements. English Nature and the Environment Agency need to ensure that identification of needs occurs in line with price review timetables. Defra and Ofwat need to ensure that funding is provided on time. Our current experiences with implementation of the EU Habitats and the Water Framework Directives indicate a high risk that we will need to implement abstraction licence changes before adequate supply-demand solutions can be implemented.

(c) Further regulation on water-saving appliances is required to ensure that all new appliances are very efficient. This is a very important measure to ensure that future water use is minimised. In the short-term this could be improved by providing regulatory incentives. A parallel initiative was the subsidising of high efficiency lights bulbs when this technology was first introduced.

(d) Water companies were disappointed that proposed water efficiency measures submitted as part of the 2004 water price review were (with a few exceptions) excluded from price limits by Ofwat. There is a need for Ofwat, Environment Agency and water companies to work closer together to agree the need and funding for water efficiency measures.
**What are the options for increasing water supply, and what are the arguments for and against?**

**Potential options**

2.1 All water companies have adopted a “twin-track” approach to maintaining a supply-demand balance and addressing the forecast deficiencies over the coming decades. The “twin-track” approach comprises addressing demand-side and supply-side actions in parallel to reduce demand and augment supply.

2.2 There are a wide range of options potentially available to help maintain the supply-demand balance, which can be broadly grouped as follows:

<table>
<thead>
<tr>
<th>Supply-side options</th>
<th>Demand side-options</th>
</tr>
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<tbody>
<tr>
<td>— New water source development</td>
<td>— Leakage reduction</td>
</tr>
<tr>
<td>(eg reservoir, river, groundwater)</td>
<td>(eg pressure control; increased leak detection</td>
</tr>
<tr>
<td>— Enhancement or re-development of existing</td>
<td>and repair; mains replacement)</td>
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<tr>
<td>water source</td>
<td>— Optional metering</td>
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<tr>
<td>— Desalination</td>
<td>— Compulsory metering</td>
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<tr>
<td>— Transfer of raw or treated water</td>
<td>— Water efficiency measures</td>
</tr>
<tr>
<td>(eg within region or between water companies)</td>
<td>(eg retro-fitting devices in toilets, or low-flow</td>
</tr>
<tr>
<td>— Water reuse</td>
<td>taps and shower-heads in bathrooms;</td>
</tr>
<tr>
<td>(eg treatment of wastewater effluent)</td>
<td>provision of water barrels for the garden;</td>
</tr>
<tr>
<td>— Production water conservation</td>
<td>upgrading building regulations)</td>
</tr>
<tr>
<td>(eg recycling of wash-water at water treatment</td>
<td>— Regulation of appliances</td>
</tr>
<tr>
<td>works)</td>
<td>(eg specifying maximum water use)</td>
</tr>
</tbody>
</table>

2.3 UU has carried out a comprehensive economic appraisal of the options available in North West England, including financial, environmental and social costs, in accordance with nationally agreed methodologies. Figure 3 summarises the findings: the options are ranked according to overall unit cost and the scheme details include the magnitude (in million litres per day, ML/D) of water that the scheme would be expected to provide. The least cost options are groundwater and certain other supply enhancement schemes, and initial leakage reduction phases to maintain the economic level of leakage. The customer metering and water efficiency options tend to have the highest unit cost values due to the relatively high costs and low volume of water savings. The types of options that are most economic are likely to differ between regions, but most water companies have identified a combination of supply-side and demand-side measures as being required.
Figure 3. Summary of UU’s economic comparison of supply and demand options

Note: AISC = Average Incremental Social Cost (pence per cubic metre), which is a measure of the total monetary and environmental cost of the scheme.

Supply-side options

2.4 The options for new source development are generally limited by natural resource availability and environmental/planning constraints. However, some new reservoirs are being promoted in the South of England with detailed environmental appraisal to ensure the mitigation of any environmental impact. The development of a new water source or a sensitive raw water transfer can take from 5 to 20 years, depending on the nature of the source, location, planning issues and engineering complexity. A new river source would typically take at least 5 years to promote whilst a new reservoir would take at least 15 years.

2.5 The time required is often much less where an existing water source is to be enhanced or re-developed, depending on the extent to which additional abstraction licence capacity is required.

2.6 In North West England, groundwater development is proposed in areas of rising groundwater where industrial water abstraction and mining activity has ceased. These are often low cost solutions with low environmental impact, which can often be planned and constructed within a few years.

2.7 In areas where fresh water resource development is severely limited, desalination may become a cost effective solution, particularly given improved membrane technology and more energy-efficient treatment process that has reduced the unit costs of production.

2.8 There has been significant interest in recent years in water reuse, whereby previously used water is recaptured, retreated and reused. Types of reuse include intensive treatment of sewage effluent for supply to customers, and use of “greywater” from wash-water in the home for toilet flushing (the latter is usually classed as a demand-side option). There are concerns about the potential health risks and how to minimise them, which has been the subject of a recent UKWIR study, and about the potential high cost. However water reuse offers a potential solution in specific cases where it is economically comparable with the other available solutions.
2.9 Water conservation by water companies in the production of water can provide useful water savings. For example, when water quality improvements are undertaken at water treatment works, recycling of backwash water rather than discharging it have been widely adopted.

2.10 Water companies are working very closely with the Environment Agency to ensure that proposed new source development is environmentally sustainable. Local planning authorities are also being consulted at an early stage. It is important that companies and statutory bodies work together to deliver supply improvements that benefit socio-economic development whilst protecting the environment.

**Demand-side Options**

2.11 Leakage from water company supply systems has been reduced significantly over the last 12 years (by some 50 per cent in North West England). Companies are now operating at or very close to the economic level of leakage. As leakage levels reduce, the remaining leaks become more difficult to detect or control, and so the costs of leakage control increase sharply.

2.12 Water companies are committed to programmes to achieve and maintain the economic level of leakage, derived using the methodology prepared by Ofwat, the Environment Agency and Defra.

2.13 We operate large water networks with very large numbers of pipe joints and connections. For example UU’s water network has some 20 million pipe joints and over 3 million service connections. Each joint or connection provides an opportunity for seepage of water. Most of the leakage that occurs comprises a large number of very small leaks that are not visible and are dispersed across the network. Such leaks are very difficult and very expensive to locate. Water company leakage programmes are therefore focussed on finding and repairing detectable leaks as quickly as possible. Further leakage reduction, beyond economic levels, is achievable to a limited degree, but only at significant additional cost. Reducing leakage beyond the economic level would result in significantly higher water prices than would otherwise be needed, together with increased disruption to road users.

2.14 The Water Industry should continue to adhere to the current and well-established methodologies to assess the economic level of leakage. This is well regulated by Ofwat and control of this measure should not be transferred to other regulatory authorities who are not accountable for assessing the impacts on customer bills.

2.15 Further details about leakage control methods and the economic level of leakage are presented at Appendix 1.

2.16 All newly-built houses in England and Wales have been metered since 1989, and all water companies offer a free meter option for household customers who wish to switch to metering. As a result household meter penetration has increased substantially over the last decade and will continue to increase (for example rising from 15 per cent currently to 60 per cent by 2030 in North West England). Schemes to accelerate the penetration of customer metering are expensive compared with other supply-demand options in the North West, as shown in Figure 3. This is because of the high cost of metering (for meter installation, account and billing services, and meter maintenance) relative to the modest quantity of water saved—opting customers in North West England tend to be already low water users and reduce their consumption by about 8 per cent after switching to metering. In some other regions with different supply-demand issues, in particular parts of South and East England, faster meter penetration would help to secure a supply-demand balance.

2.17 Metering does raise concerns for vulnerable sectors of society who may be unable to afford higher water bills (eg large families on low incomes, customers with specific health problems requiring high water use). Government needs to continue to address these issues through social welfare measures, rather than through cross-subsidy from other water customers.

2.18 Water companies have carried out a significant amount of customer education and promotion of water efficiency (a statutory requirement), and issued large numbers of customers with free water saving devices (eg cistern devices to reduce toilet flush volumes, and water butts and hosepipe “trigger guns” to reduce water use in the garden). Many companies have also undertaken household audit programmes by which individual homes are visited, water saving devices are fitted (egcistern device, low-flow tap inserts), dripping taps are repaired and water saving advice is provided. A summary of UU’s wide-ranging water efficiency programme is presented at Appendix 2.

2.19 The volumes of water saved by water efficiency measures available to water companies are often relatively small, even with widespread promotion as only a proportion of customers willingly take-up any initiative. Also, as these measures depend on the continued customer involvement, there are concerns about the reliability and sustainability of water savings. However, it is recognised that active promotion of demand
management is very important to ensure awareness by customers of the need to use water efficiently, and to provide them with information and practical measures to achieve savings.

2.20 Water companies also actively advise and support non-household customers to improve water efficiency (often driven by the need to make cost savings), including water audits and promotional material for employees. Many non-households have implemented significant water efficiency programmes, particularly as part of waste minimisation initiatives where the reduction in water bills outweighs the cost of installing efficiency measures.

**Summary**

2.21 Supply-side options generally provide more predictable and larger quantities of water than demand-side options. There are concerns about the environmental impact associated with some supply schemes, which need to be carefully considered in the appraisal of available options. Some supply schemes, in particular new reservoirs, require long lead-in times of over 10 years. However, in North West England there are several opportunities for groundwater development at relatively low cost and low environmental impact, which can be developed in a much shorter time.

2.22 Demand-side measures are important options for reducing the quantities of water that need to be abstracted, particularly those that provide sustained savings. Leakage is generally at or near economic levels, and further reductions would be increasingly costly and disruptive to road users, particularly in the case of mains replacement programmes. Faster penetration of household metering is relatively expensive in North West England (compared with other options) and would raise difficulties for vulnerable sectors of society who may be unable to afford higher water bills. The promotion of water efficiency measures continues to make a useful contribution but additional measures tend to be expensive, provide small quantities of water and there are concerns about the reliability and sustainability of the savings.

2.23 It is vital that the right balance between supply reliability, environmental impact and affordability of water charges is achieved in strategies to maintain the supply-demand balance. Therefore economic appraisal (including appropriate environmental and social costs) should continue to be used to select optimal solutions, including the setting of leakage reduction targets. This will result in the selection of the right combination of appropriate supply-side and demand-side measures.

2.24 It is important to continue research and development into leak detection and repair techniques to find more efficient ways of finding and repairing leaks, and identifying new, more efficient water efficiency solutions.

*What are the likely future trends in water demand, and what can be done to manage demand more effectively, and to influence the behaviour of consumers and others?*

**Demand Trends**

2.25 Water companies have developed detailed demand forecasts using national methodologies agreed with the Environment Agency. The methods use micro-component approaches to assess each and every component of demand. Forecast accuracy has improved significantly as a result and all companies produce forecasts for at least a 25 year planning horizon. In some parts of the UK demand for water is expected to increase, but in North West England water demand is forecast to reduce slightly, as shown in Figure 4.
Figure 4

FORECAST WATER DEMAND IN NORTH WEST ENGLAND (MILLION LITRES PER DAY)

2.26 The key trends for the UU region are:

(a) Leakage from water company supply systems has already been reduced significantly over the last 12 years (by some 50 per cent in North West England), and will reduce by a modest amount in the future to achieve the economic level of leakage (the level at which further reductions are more expensive than other demand management or supply enhancement options).

(b) Non-household consumption is expected to continue falling slowly and then stabilise over the next 10 years as the economy completes the shift from the traditional, manufacturing base to a service-based economy.

(c) Household demand has steadily risen over the past 70 years (around 1 per cent per year since the 1930s), and currently averages about 150 litres per head per day for unmetered houses and about 135 litres per head per day at metered houses. We expect household water consumption to rise more slowly in the future, with different trends for the various components:
   — Reduced use for toilet flushing (as low flush toilets of maximum of 6 litres gradually become the norm).
   — Reduced use on clothes washing and dishwashing as new appliances become more efficient.
   — Greater use for personal washing due in particular to more frequent washing and greater ownership of power showers.
   — Increasing use of water for garden watering.
   — Increasing proportion of households whose water use is metered.

Influencing Customer Demand

2.27 The options that are available to reduce customer demand (eg customer metering and water efficiency measures) are described above in paragraphs 2.1 to 2.24. The actions required to influence the take-up and water savings by customers are discussed below.

2.28 UU has observed increased take-up by households of the free meter option in recent years in response to rising water prices and our publicity of the scheme. However, these customers tend to be relatively low water users who are switching to metering in order to save money and so the quantities of water saved are modest.
2.29 Targeted metering of high water users would be of more relevance to the supply-demand balance particularly in some parts of the South and East of England. However, compulsory metering of customers is prohibited under the Water Industry Act 1999, except in specific cases, limiting the rate of meter penetration. 

2.30 A coherent national strategy concerning the extension of household metering is required, as it is not clear what Government’s long-term plan is. The strategy should include measures to accelerate metering of customers and making approval of compulsory metering programmes much easier. Although the need for and benefit of metering is much less in North West England compared with the South East, a national strategy is needed which clarifies the long-term plans for metering across the country (with regional variations), and enables universal metering in areas of greatest need.

2.31 Extensive programmes have been carried out by water companies to promote water efficiency by customers—see for example the summary of UU’s programme presented at Appendix 2. There is scope for some further measures, including the special farms and parks water efficiency programme being planned by UU. However, there is a priority need for more research to find new demand-side solutions that are cost-efficient and can make significant contributions to the supply-demand balance.

2.32 Further regulation on water-saving appliances (in particular power showers, garden sprinklers, washing machines and dishwashers) is required to ensure that new appliances are as water efficient as possible. This is a very important measure to help ensure that future water use is minimised. The cumulative impact over several years would be substantial.

What contribution can science, engineering and technology make towards reducing water use or waste by households, businesses and the public sector?

2.33 It is important to continue research and development into leak detection and repair techniques to find more efficient ways of finding and repairing leaks. Companies have already introduced a range of new technologies primarily based on the acoustics of a leaking pipe (such as digital noise correlators). If the unit costs of leak detection and repair can be reduced, this will reduce the relative costs of leakage control and alter the economic levels that can be achieved.

2.34 Currently installed water meters only measure cumulative volume of water and so only permit tariffs based on total volume of consumption. They do not enable tariffs to be used that vary the charge according to the time of use (eg seasonal peak flow, or time of day of consumption). There is therefore a need for low-cost “smarter” meters which would enable more complex tariffs to be applied and help control peak consumption at critical times. Such meters would also enable companies to provide more detailed information to customers about their consumption and how to be more efficient. UU is involved in a consortium of water companies led by Severn-Trent Water to develop such a meter. The cost of the meter will be modestly higher than current meters without these features, and so its wider implementation will require adjustment in the costs allowed in the price reviews undertaken by Ofwat.

2.35 UU is concerned that there are limited water efficiency options currently available that cost effectively save significant quantities of water. There is an urgent need for more research to find cost-efficient demand-side solutions that can make significant contributions to the supply-demand balance.

2.36 We therefore welcome the announcement by Water UK concerning the establishment of WaterWise, a new organisation jointly funded by all water companies. Acting independently, its aim is to support further demand-side actions to balance supply and demand. WaterWise aims to build links between affordability and water efficiency, make the economic case for funding water efficiency measures through the water price review process, and promote the benefits of water efficiency to customers.

What is the current state of the water supply and drainage infrastructure? Is there sufficient investment in its improvement?

3.1 UU owns and operates over 40,000 km of water mains, much of which is over 100 years old. We are part way through a major, 20 year programme to renew large portions of the distribution system to improve drinking water quality, including 2700 km in 2005-10. We also have a targeted programme to replace old mains in poor condition that are prone to burst, for the purpose of reducing the level of water leakage.

3.2 We are not planning any major mains replacement programme solely for the purpose of leakage reduction, because our experiences have shown this to be generally an expensive supply-demand solution compared with other leakage reduction measures or supply enhancement options. (In Figure 3, mains replacement is represented by the “Leakage 5” option). This is because of the high cost of replacing long
lengths of mains, and the disruption to adjacent parts of the distribution system (which can lead to increased leakage). There would also be significant disruption to road users.

3.3 In North West England there are some 40,000 km of sewers, much of which is over 100 years old. UU is continuing with major rehabilitation programmes to improve the drainage infrastructure, in particular to reduce flooding, sewer collapses and unsatisfactory combined sewer overflows to watercourses. The issues regarding funding of future programmes were covered in the Government’s “Making Space for Water” which advocated a more integrated approach to drainage management and that the Environment Agency, water companies and other partners work more closely together in assessing future needs. Drainage infrastructure does not have any direct impact on the water management issues which are the primary subject of this Inquiry, but UU would be happy to provide more details if required.

3.4 We support the use by Ofwat of the risk-based “common framework” methodology for assessing investment needs to maintain water and wastewater assets. It provides a systematic approach for targeting long-term investment plans where most needed.

3.5 There is inconsistency, however, in the standards of resilience for infrastructure. Different Government departments are reviewing the operation of infrastructure networks and promoting different standards for the minimum security standards. For example, wastewater drainage systems are currently designed for 1 in 30 year events, and funding is included in water price limits based on this standard of service. Land drainage systems are instead designed for 1 in 100 year events, and the DTI review of electricity networks is considering 1 in 1000 years. Mr Elliott Morley has commented that, following the 1 in 200 year flooding event at Carlisle, the city should never flood again. This suggests the need for a more co-ordinated approach to setting of such standards.

The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at national and European levels, adequate?

4.1 The 2003 Water Act placed a duty of care upon water companies and Defra in respect of ensuring the efficient use of water. The Environment Agency retains the duty to ensure the proper distribution and use of water resources. Imposing the duty to conserve upon privatised water companies reinforces their requirement to take all practical measures to minimise the need for abstraction of water from the environment. In this sense the duty is properly placed on water companies. However, this responsibility should have been additionally placed on other abstractors, for example power and agricultural sectors.

4.2 The duty to conserve water resources is also properly placed on government, which has a responsibility to ensure that public organisations, including local authorities, schools and hospitals, are prudent in their use of a precious resource. Such bodies are, collectively, very large users of water and there is significant further scope for saving water and water bills. Progress is often limited by lack of an identified local “champion” to ensure that initiatives are progressed.

4.3 The water regulator has recently taken on the new duty to promote sustainability. It is too early to test the extent to which this has been embraced. An issue that may need to be addressed is the approach to be taken where the most economically viable solution is not the sustainable solution. This will test Ofwat’s adherence to the new duty.

How does water figure in the development of Government policy in areas such as housing, land use planning and industry?

4.4 Central and local government and the construction industry should play a key part in ensuring new public and private developments incorporate water efficiency measures in their design. This would be a very important measure to ensure that future water use is minimised.

4.5 Water companies are not statutory consultees in the planning process, and so, for example, water use in new development does not seem to be fully considered as part of planning approvals. This should be changed.

What can the UK learn from the experience of other countries?

4.6 The privatised water industry model of England and Wales is looked to and learned from by many other countries. The publicly owned model more recently developed in Scotland is also one which attracts the interest of countries considering reform of their own water sectors, where the prospect of privatised water companies earning profits in the provision of water and wastewater services is deemed to be culturally and/or philosophically difficult.
4.7 The UK water industry leads the world in much of what it does. At the same time, the UK can learn from the experience of other countries with regard to managing demand through metering and tariff systems. In places like Singapore and Holland customers receive bills showing consumption profiles in charge bands, with advice as to how bills could be reduced by changing water use, habits, patterns etc. We should seek to learn from such experiences, as we inevitably move towards a society that will have to value water more highly, and pay for it on a more rational basis.

*September 2005*

**APPENDIX 1**

**Economic Level of Leakage**

The purpose of this Appendix is to outline the intensive efforts being carried out by UU and other water companies to drive leakage levels as low as is economically achievable.

**ECONOMIC LEVEL OF LEAKAGE**

The “economic level of leakage” is the level at which the cost of further leakage reduction exceeds the cost of alternative measures to manage demand or augment supply.

Water companies calculate the economic level of leakage as an integral part of their assessment of the supply-demand balance using a national methodology set out by Ofwat, Environment Agency and Defra (the “Tripartite Report”). This incorporates a requirement to assess the environmental and social costs/benefits of leakage control and the other alternative measures to balance supply and demand.

Leakage control is very costly, as explained below. As the level of leakage reduces, leaks become more difficult to find, and so the costs increase sharply. This is illustrated in the graph below, which shows an example of the way in which the cost of active leakage control (ALC) increases as the leakage level reduces towards the minimum practically achievable using existing technology.

**Causes of Leakage**

Distribution systems consist of a wide range of pipes, joints and service connections, of various construction and age, and laid in differing ground conditions, and so they have various rates of deterioration. They operate in a hostile environment that is subject to frequent changes. As a result leaks can arise due to a variety of factors such as:

— Type of pipe material or joint method;
— Imperfections in manufacture or method of laying;
— Changes in operating conditions, in particular due to required changes in outputs from water treatment works;
— High stress conditions due to elevated pressure regimes because of topography;
— Ground conditions, especially in causing external corrosion or susceptibility to movement or mining subsidence;
— Aggressive water characteristics;
— Adverse weather, including frost or prolonged dry conditions which can result in bursts or movement of pipes; and
— Traffic vibrations and disturbance by human activities.

Leakage can be categorised into two main types:
— Background losses: the aggregation of small sources of leakage, often of “pin-point” size, whose individual flow may typically be less than 0.5 m³/h. These can be expected to run continuously undetected or grow until they become large enough to be detected. It is generally impractical and uneconomic to eliminate them because of the difficulty in their detection and their diffuse occurrence. Background losses represent over half of total leakage in the UU region.
— Bursts: larger individual events which have variable duration. Some become evident very quickly whilst many may remain invisible and unreported for many days or weeks. Monitoring of water flows at key points in the distribution system gives UU indication of when a burst or high leakage is occurring. However, if the leak is not evident on the ground surface it can often be a protracted process, even with best current technology, to track down exactly where the leak is.

The problem of leakage is generally worse in Northern England than in the South and East because of:
— The age of the network, much of which is over 100 years old dating back to the industrial revolution when major expansion in water supply took place in North West England;
— The hilly terrain which results in widespread high pressures needed to ensure adequate flows reach centres of population;
— The aggressive, acidic soils in which many of the Victorian cast iron pipes were laid; and
— The aggressive, acidic waters that were carried for many decades with only minimum treatment.

**Summary of UU Leakage Control Actions**

Water companies in the UK have implemented the comprehensive national guidelines in the Water Industry’s manual “Managing Leakage” which documents best practice in leakage detection and control methodologies. The main elements of UU’s leakage reduction strategy are described below.

**Establishing district meter areas**

UU has set up 2300 metered zones covering over 99% of the region’s properties, to monitor levels of leakage occurring in each discrete area. This enables us to rapidly detect areas where leakage is occurring or has risen.

**Leakage detection and repair**

UU continues its extensive leakage detection and repair programme to minimise the response times within regulatory constraints (eg street works legislation). Leaks are detected by:

— UU leakage detection teams in each area who use a range of equipment such as leak noise correlators to identify the locations of leaks which cannot be seen on the ground. The deployment of these teams is targeted on those district meter areas where the highest levels of leakage are found to be occurring from the nightly district meter records.
— Members of the public reporting leaks to UU, either to their local depot or to the central customer services team using the free LeakLine telephone number. This service is promoted through leaflets that accompany customer bills and magnetic signs placed on our vans.

All reported or detected leaks are recorded on UU’s computerised management system which raises work orders with the leakage repair teams. We ensure that any leak that is reported to us by a customer or found by our leak detection teams is promptly repaired within times that are consistent with warning periods and
the *New Road and Street Works Act 1991* notice periods. Under the terms of Section 74 of this Act, we are obliged to provide notice of the work to local authorities. This notice period varies depending on the nature of the work and the location. During 2004–05 we repaired a total of 22,000 leaks.

We use a range of traditional and new detection methods for detection of non-visible leaks. Since 1999 we have extensively employed semi-permanent acoustic noise loggers in localized areas for leak detection to complement standard techniques such as step testing and sounding. The use of semi-permanent acoustic loggers has improved productivity in urban areas with largely metallic mains however they have been less successful in rural areas with predominantly plastic and non-metallic mains.

**Reducing pressure**

Pressure management is a key component of our economic leakage reduction strategy. Over the last 10 years we have installed over 2,000 pressure management valves resulting in a coverage of over 2 million properties (ie 65% of the region’s properties). In addition, a further 19% of properties benefit from pressure control through the operation of pumping stations and service reservoirs.

We continue to install further pressure control systems and to optimise (and automate where appropriate) the operation of existing pressure management schemes in order to maximise the leakage reduction benefits.

The average zonal night pressure (AZNP) has reduced from 49 m in 1994–95 to 42 m in 1997–98 and to 39 m head currently. We plan to achieve 38 m head. It is not economically practical to significantly further reduce AZNP, as areas not currently pressure managed tend to be very small, are expensive to commission and produce smaller volumetric savings. Furthermore, the impact of pressure reduction on the duties of the Fire Service (who require adequately high pressures in order to be able to fight fires effectively), fire sprinkler systems and customers with common supply pipes have to be considered before installing pressure management. These requirements therefore limit the extent to which further reductions can be achieved.

**Free supply pipe repairs**

In 1996 we introduced a region-wide free supply pipe repair service for household customers. Under this scheme, domestic customers with a leak on their supply pipe are entitled to have their pipe repaired free of charge. The scheme is free for the first repair carried out on the main provided that the pipe is outside and not underneath a building, rockery or pond.

This service is publicised in the Company’s billing leaflet and water saving literature, and also on UU’s website. The scheme has been very popular with our customers. Over 60,000 supply pipes have been repaired and over 1,700 supply pipes have been replaced under the scheme since 1997–98. We are continuing with this free service although it is no longer an economically attractive measure as it saves low volumes of water for an expenditure of around £1 million per year.

**Trunk mains and service reservoir losses**

We have carried out a lot of work to investigate losses and leakage upstream of district meter areas following the establishment of an upstream monitoring system in previous years. The work has focused on identifying areas of water consumption and water losses on trunk mains, aqueducts and service reservoirs as well as ensuring that water taken from the upstream system is accounted for correctly. Often, however, the balances highlight problems with production meters, unknown connectivity and network control rather than real trunk main leakage. The methodologies adopted are integrated within the leakage monitoring and analysis system (WRIMS).

Service reservoir leakage is assessed as part of our routine maintenance schedule. Each time a service reservoir is cleaned, it is drop tested on completion. Drop tests are undertaken at two to five year intervals but checks for leakage are undertaken in the meantime. All service reservoirs are surveyed every three months for drainage flows. Major reservoirs are continuously monitored for overflows through telemetry systems, and data for these sites is stored on WRIMS for long-term trend analysis. The weekly demand zone balances highlight suspect reservoirs requiring investigation.
Mains rehabilitation

Around 900 km of water mains across the region have been renewed each year, mainly as a consequence of our investment programme to improve drinking water quality. We also have a “poor condition mains programme” to replace mains which are likely to be at high risk of bursts. Identification of poor condition mains is carried out by analysis of burst frequency, and focuses investment on improving serviceability.

New technology

UU have introduced a wide range of new technologies primarily based on acoustic methods of leak detection, automatic pressure management systems and telemetry devices for rapid reporting of flow measurements. We continue to test and deploy new techniques as they become available.

Network integrity

We have recently completed a detailed sample audit to investigate the network integrity of the district meter areas. We are carrying out further audit checks in other areas and make corrective actions where necessary to ensure we maintain good network integrity.

APPENDIX 2

Summary of UU’S Water Efficiency Programme

The purpose of this Appendix is to outline the wide-ranging programme of actions carried out by UU to promote water efficiency. The other water companies have similar programmes.

Our water efficiency actions during 2004–05 included:

— Promotion of the free meter option in the billing leaflet sent out to all unmeasured customers during February and March and to 11,000 ExtraCare customers through the InTouch magazine;

— Installation of meters at 22,800 new houses and 40,300 houses that opted to switch to metering under the free meter option scheme.

— Continued our communications campaign to encourage customers to use water wisely via our annual billing leaflet, website, local press releases, our educational centres and public relations services;

— Continued to leave a pack called A simple guide to your water meter with household customers after a meter is installed. The pack contains water saving information together with a water conservation questionnaire;

— Provided “Water Savers Packs” free of charge on request. This includes a “Save-a-flush” water saving device, a water conservation questionnaire, advice and tips on how to save water in the home and garden, a water butt promotion and information for our younger customers on being water-wise. Instructions on how to use the “Save-a-flush” are included on the front of the unit.

— Market research conducted last year provided customer feedback and recommendations on how to improve the water saver’s pack. As a result, this year we updated and re-launched the booklet and included information aimed at our younger customers to encourage them to be water-wise.

— Maintained partnerships with external bodies to promote water conservation, such as local councils and authorities, for water butt promotions and Save-a-Flush promotions via the company’s toilet model display.

— Advertised the telephone number to request free Save-a-Flush devices in local council guides including:

  — Rochdale Council tax guide (distributed to 118,000 domestic homes and 7,000 businesses).
  — St Helens Environmental guide (distributed to 82,000 residents).
  — Trafford MBC Environmental guide (distributed to 90,000 residents).

— Advertised the telephone number to request free Save-a-Flush devices via a poster display in selected stores across the region.

— Distributed 67,828 “Save-a-flush” water saving cistern devices to household customers, and 4,323 to non-household customers. Previous demand management trials have shown that the provision of cistern devices is one of the most cost-effective ways of reducing water consumption.
— One-day water efficiency events were held at selected stores across the region where 9,000 cistern devices were handed out to shoppers during June and July. The stores targeted were in Stockport, Rochdale and Macclesfield.

— 1,468 water butts have been sold through offers in the billing leaflet, Refresh magazine and other mailing promotions.

— UU’s “toilet” display model which is used to promote cistern devices and water efficiency in the home, visited key environmental events across the region.

— The “toilet” display model was also used to promote cistern devices and water efficiency in the workplace and has visited several industrial sites.

— The Key Customer Management team held water efficiency days at nine key customer sites. These events involved hosting a stand and distributing water saving devices such as Save-a-Flushes, hose guns and water bottles to employees at these sites and promoting the “Get water wise in the workplace” initiative.

— Developed and launched a water efficiency guide aimed at UU’s small to medium-sized customers. The guide is distributed via the Groundwork organisation that actively visit this group of customers. The guide encourages our customers to order Save-a-Flush cistern devices, waterwise posters and self-water audits guides.

— Sponsorship of the Envirowise “Big Splash” campaign including a bill insert used to communicate the initiative to our commercial customers and a link from our website to the Envirowise website.

— HotelWise card developed and launched, in partnership with the Environment Agency, aimed at encouraging hotel guests to think about their water usage while on holiday and once they return home. Hotels around the region are able to request as many cards as they require.

— Key Customer Managers made 832 visits to non-institutional customers and promoted the availability of our water efficiency services, which led to two water audits and 275 leakage detection surveys and/or repairs.

— Similarly, Key Customer Managers made 252 visits to institutional key customer sites, which led to three water audits and 69 leakage detection surveys and/or repairs.

— During the year water fittings inspections were undertaken at 4,829 non-household customer sites.

— UU is a member of the WaterSave Network which brings together Universities, water companies and other organisations to share findings of water efficiency research studies.

— We are embarking on an evaluation study of novel (i.e., low water using) power showers. Water use by power showers is predicted to increase significantly as the ownership of such devices increases, however lower water using appliances are becoming available, for example aerated showers.

— In addition we are planning a special farms and parks water efficiency programme to carry out a targeted water conservation project to provide specific water efficiency advice to 10,000 farms and 1,000 gardens/parks across the region.

Memorandum by the Veolia Water Group

The Veolia Water Group of companies comprises Three Valleys Water, Folkestone & Dover Water and Tendring Hundred Water. These companies supply water only to 3.3 million customers in the south-east of England. We welcome the opportunity to respond to the Select Committee on water management.

SECTION 1. DEFINING THE PROBLEM

What are the causes of the current problems of water supply, and how serious are they?

Over the last 12 months many parts of the UK have received much lower rainfall than average. For some parts of the UK the 10 months to the end of August were the 6th driest 10 month period since records began in 1882. This has resulted in significantly less water available in reservoirs, rivers and groundwater than usual although the impact on groundwater levels depends on local hydrological conditions.

Dry weather also stimulates additional demand for water, in particular for watering of gardens. The actions taken by water companies to publicise awareness of the need to conserve water, and in some cases impose hosepipe bans, are part of their prudent water resources management plans to ensure adequate water supplies for future months. At Three Valleys Water and Folkestone & Dover Water it has not been necessary to impose restrictions on use during 2005 but in light of the current hydrological conditions companies have mobilised
their Drought Management Plans. There have been no supply difficulties in the Tendring Hundred supply area.

Drought management plans, which are agreed with the Environment Agency, include a range of actions to be taken as various defined trigger points are reached. Occasional non-essential water use restrictions (such as hosepipe bans) are an essential part of drought management and ensuring that we do not run out of water under the most severe conditions on record. Large-scale supply or demand solutions would be required to avoid hosepipe bans in severe droughts. These would incur large costs and environmental implications, which would outweigh the customer impact of occasional bans.

The current conditions remain a concern and if winter rainfall and recharge is less than 80 per cent of the long-term average then we are forecasting new lowest groundwater conditions for the south-east Chalk for 2006.

What are the projections for future water supply, and what factors will influence these projections? Where, and over what timescales, may problems emerge?

In the short term we are dependent on winter rainfall to replenish groundwater supplies. The severity of the situation for next year will be heavily influenced by rainfall over the winter.

In the longer term we expect water availability at existing water supplies to reduce significantly in the future due to the effects of climate change and of environmental legislation. In addition in the South and East England, supply needs will also be significantly affected by growth in housing and population. These pressures will result in more frequent and more severe water shortages unless action is taken to accept and fund substantial “twin-track” supply-demand solutions.

The largest risk to water supply in the longer term is climate change. A recent DEFRA study indicated that changes in demand due to climate change will be relatively modest (around +2 per cent by 2025–30) but it is the likely reduction in water resource availability that is of most concern.

The effects of climate change include:

- Reliable supply from water sources may reduce due to more severe droughts.
- Level of service for hosepipe ban frequency may deteriorate due to more frequent droughts.
- Demand for water by customers may increase in hotter summer periods.
- There may be greater pressure to reduce abstraction to protect the water environment due to an overall lowering of river flows/groundwater levels.
- Water quality in reservoirs and rivers may be affected by higher temperatures and lower dilution, with consequent impacts on water treatment.
- Water quality in reservoirs and rivers may be affected by more severe storm events and greater soil runoff, with consequent impacts on water treatment.
- More frequent storm damage may occur to water supply assets.

The industry is also concerned about the deterioration of groundwater as a result of pollution. There is already a substantial loss of groundwater availability from both point source and diffuse pollution, (nitrates and pesticides in particular), and this is expected to deteriorate over the next 10 to 15 years before the impact of the Water Framework Directive is seen. Even then improvements may be slow as there is currently no expectation of remediation of groundwater and this means the pollution may remain for many years and sterilise its use for public water supplies. These losses will be reduced by investment in additional water treatment processes and distribution changes to enable blending of different waters to be carried out and this results in an increase in charges to our customers. In practice this acts as a cross subsidy for polluters which may contradict the intent of the Water Framework Directive.

Reliable supply is generally forecast to reduce in all parts of the country over the next five to 15 years as a consequence of abstraction licence reductions. These will result from environmental legislation, (including the EU’s Habitats and Water Framework Directives), and the Environment Agency’s abstraction management policy. The risk of supply shortages will increase unless ‘twin-track’ supply-demand investments are mobilised in sufficient time to replace those lost resources. In particular due to the long lead times for large scale regional resource schemes, up to 20 years, it is essential that such projects proceed in parallel with demand management measures.
Is sufficient research being devoted to predicting, and handling, possible future scenarios?

An important contribution to research into predicting and handling possible future water management scenarios is carried out by UKWIR, the water industry’s research organisation. This research, which is sometimes jointly sponsored by the Environment Agency, is initiated by specialist water company representatives and is directed towards addressing the real problems facing the industry.

Climate change is the largest risk in water resources planning because of the current uncertainty in the predictions and the very large impact that is expected. A lot of work has been carried out, and is continuing, by UK Climate Impacts Programme (UKCIP), UK Water Industry Research (UKWIR), the Environment Agency and other research organisations to define climate change scenarios and their impacts for the water industry.

Water companies have applied a standard range of scenarios in our modelling of climate change impacts on water supply availability. However we are concerned to reduce the uncertainty about the climate change predictions to enable adequately robust investment decisions. The Foresight Scenarios covered a range of futures however the key question when relating water supply to these scenarios is how much water supply should aim to cover all possible futures? The industry is investigating how probabilities may be applied to climate change scenario’s to enable improved modelling of the impact on water resources.

Is the response of Government, the EU, regulators and the industry adequate?

In addition to water companies, central and local Government, the water industry regulators (Ofwat, Drinking Water Inspectorate and Environment Agency) and environmental bodies (such as English Nature), all play a key role in determining policy and influencing supply-demand investment. It is therefore important that there is joined-up policy and regulation. Closer integration between these public bodies is still required to achieve a sustainable supply-demand position across the UK.

There is a need for Government and regulators to agree on the explicit inclusion of “twin-track” supply-demand investment arising from climate change impacts in water pricing reviews. The next review is in 2009. This is essential to ensure that water companies can implement actions in time to prevent water shortages. Whilst it will not be possible to determine precise impacts, measures to increase the resilience of water supply systems to climate change will be needed in the medium term (next 10 years).

Further regulation on water-saving appliances is required to ensure that all new appliances are water efficient. Accordingly we are pleased that work is now in hand to amend the building regulations to promote water efficiency measures. Water companies were disappointed that proposed water efficiency measures submitted as part of the 2004 water price review were (with a few exceptions) excluded from price limits by Ofwat. There is a need for Ofwat, Environment Agency and water companies to work closer together to agree the need and funding for water efficiency measures. We welcome the establishment of Waterwise and expect to work closely with them to improve the scale and robustness of cost/benefit data to ensure there is a sound basis for appraisal of water efficiency measures for PR09.

The uncertainties surrounding future water supplies require a less prescriptive and more pragmatic approach to be taken by regulators. The “precautionary principle” must not be used as an excuse for prevarication; public water supply is too important.

Section 2. Supply and Demand

What are the options for increasing water supply, and what are the arguments for and against?

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<thead>
<tr>
<th>Option</th>
<th>For</th>
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<tr>
<td>New reservoirs</td>
<td>— Reliable yield</td>
<td>High capital costs</td>
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<td></td>
<td>— Relatively low operating cost</td>
<td>Planning issues</td>
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<td>Environmental concerns</td>
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<td>Loss of land</td>
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<td>Dam raising</td>
<td>— Low operating costs</td>
<td>Dams not always suitable</td>
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<td>Yield may not necessarily increase</td>
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<td>Further land loss</td>
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<td></td>
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<td>Environmental concerns</td>
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<td>Pumped storage</td>
<td>— Relatively low capital cost</td>
<td>High operating costs</td>
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<td></td>
<td>— Better use of existing storage</td>
<td>Not all reservoirs are suitable</td>
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<tr>
<td>Option</td>
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<td>River intakes</td>
<td>Low environmental impact</td>
<td>Low capital cost</td>
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<td></td>
<td>No loss of land</td>
<td>Poor water quality</td>
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<td></td>
<td>Little or no summer yield</td>
<td>May have environmental concerns</td>
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<td></td>
<td>Low capital costs</td>
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<tr>
<td>Licence changes</td>
<td>Virtually no costs</td>
<td>Environmental concerns</td>
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<td>Boreholes</td>
<td>Usually good quality water</td>
<td>Not all areas suitable geologically</td>
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<td>Incremental developments possible</td>
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<td>Low environmental impact</td>
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<td></td>
<td>Relatively low operating costs</td>
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<tr>
<td>Aquifer recharge</td>
<td>Low environmental impact</td>
<td>Not all geology suitable</td>
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<td></td>
<td>Relatively low capital costs</td>
<td>Mixed results from trials</td>
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<td>Conjunctive use</td>
<td>Effective use of existing system</td>
<td>Complexity of operation</td>
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<tr>
<td></td>
<td>Low environmental impact</td>
<td>Water transfer costs high</td>
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<tr>
<td>Bulk transfers</td>
<td>Effective use of resources</td>
<td>Adjacent areas may not have surplus</td>
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<td>Water grid</td>
<td>Evens out surplus/deficit areas</td>
<td>High operating costs</td>
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<td>Low environmental impact</td>
<td>High capital costs</td>
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<td>Desalination</td>
<td>Reliable and unlimited yield</td>
<td>High operating costs</td>
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<td>High capital costs</td>
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<td>Debatable environmental value</td>
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What are the likely future trends in water demand, and what can be done to manage demand more effectively, and to influence the behaviour of consumers and others?

Water companies have developed detailed demand forecasts using national methodologies agreed with the Environment Agency. The methods use micro-component approaches to assess each and every component of demand. Forecast accuracy has improved significantly as a result and all companies produce forecasts for at least a 25 year planning horizon. Demand forecasts vary across the country with some reductions in demand anticipated in the North of England whilst the South anticipates some growth.

Leakage from water company supply systems has been reduced significantly over the last 12 years. Companies are now operating at or very close to the economic level of leakage. As leakage levels reduce, the remaining leaks become more difficult to detect or control, and so the costs of leakage control increase sharply. Water companies are committed to programmes to achieve and maintain the economic level of leakage.

We operate large water networks with very large numbers of pipe joints and connections. Each joint or connection provides an opportunity for seepage of water. Most of the leakage that occurs comprises a large number of very small leaks that are not visible and are dispersed across the network. Such leaks are very difficult and very expensive to locate. Water company leakage programmes are therefore focussed on finding and repairing detectable leaks as quickly as possible. Further leakage reduction, beyond economic levels, is achievable to a limited degree, but only at significant additional cost. Reducing leakage beyond the economic level would result in significantly higher water prices than would otherwise be needed, together with increased disruption to road users.

All newly-built houses in England and Wales have been metered since 1989, and all water companies offer a free meter option for household customers who wish to switch to metering. As a result household meter penetration has increased substantially over the last decade and will continue to increase. However the rate of change is not sufficient to manage demand and make room for the substantial housing growth expected in the South East. Folkestone & Dover Water are applying to the Secretary of State for water scarcity status that will enable a targeted metering programme to be implemented. In addition Three Valleys Water has implemented a metering programme on the basis of “change of occupier” that will help to secure a supply-demand balance. The companies are sharing their expertise with industry research to verify the assumptions for the impact of metering to ensure plans are made on a secure footing.

There are, however, areas that would benefit from changes in regulation. For example there has been a huge rise of sales of large paddling pools in recent years in the south-east. These pools are emptied every two or three days and thus water consumption increases substantially. In our view such consumption is unreasonable.
unless customers are required to transfer to a metered supply. We would welcome changes in regulation to facilitate this.

The Veolia Water companies work with regional planning and local authorities to ensure compatibility of plans with water resource planning. We welcome the new obligations for water conservation in the Water Act 2003 and we encourage planners to explore options for water efficiency in regional and local frameworks. We also work with developers and are keen to see water efficiency and sustainability measures included in their schemes.

Water companies have carried out a significant amount of customer education and promotion of water efficiency, (a statutory requirement), and issued large numbers of customers with free water saving devices (eg cistern devices to reduce toilet flush volumes, and hosepipe “trigger guns” to reduce water use in the garden). Many companies have also undertaken household audit programmes by which individual homes are visited, water saving devices are fitted (eg cistern device, low-flow tap inserts), dripping taps are repaired and water saving advice is provided.

UKWIR are currently investigating the sociology of water use in partnership with Lancaster University. This three year research programme aims to understand human motivations towards water use in the hope of shedding further light on how consumer behaviours can be influenced.

What contribution can science, engineering and technology make towards reducing water use or waste by households, businesses and the public sector?

Currently installed water meters only measure cumulative volume of water and so only permit tariffs based on total volume of consumption eg rising block tariffs. They do not enable tariffs to be used that vary the charge according to the time of use (eg seasonal peak flow, or time of day of consumption). “Smarter” meters which would enable more complex tariffs to be applied and help control peak consumption at critical times could be used but there is a need to balance the additional costs of more sophisticated meters with the derived benefits. Improving metering technology and reducing the cost of ‘smart meters’ would facilitate the introduction of complex tariffs.

There are limited water efficiency options currently available that cost effectively save significant quantities of water. There is an urgent need for more research to verify robust cost-efficient demand-side solutions that can make significant contributions to the supply-demand balance.

Water UK have established WaterWise, a new organisation jointly funded by all water companies. Acting independently, its aim is to support further demand-side actions to balance supply and demand. WaterWise aims to build links between affordability and water efficiency, make the economic case for funding water efficiency measures through the water price review process, and promote the benefits of water efficiency to customers.

SECTION 3. INFRASTRUCTURE

What is the current state of the water supply and drainage infrastructure? Is there sufficient investment in its improvement?

We support the use by Ofwat of the risk-based “common framework” methodology for assessing investment needs to maintain water and wastewater assets. It provides a systematic approach for targeting long-term investment plans where most needed. The serviceability of assets is something which can however only sensibly be ascertained over the long term and this is, to some extent, at odds with the five year financing cycle of the water industry. At PR04 Three Valleys Water was successful in gaining approval for a higher rate of investment in renewal of our network assets however more work is required in this area.

There is inconsistency, however, in the standards of resilience for infrastructure. Different Government departments are reviewing the operation of infrastructure networks and promoting different standards for the minimum security standards. For example, wastewater drainage systems are currently designed for one in 30 year events, and funding is included in water price limits based on this standard of service. Land drainage systems are instead designed for one in 100 year events, and the DTi review of electricity networks is considering one in 1,000 years. Mr Elliott Morley has commented that, following the one in 200 year flooding event at Carlisle, the city should never flood again. This suggests the need for a more co-ordinated approach to setting of such standards would be helpful.
SECTION 4. CONTEXT

The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at national and European levels, adequate?

We welcome the 2003 Water Act that placed an additional duty upon water companies, Defra and all public bodies in respect of water conservation. The Environment Agency retains the duty to ensure the proper distribution and use of water resources. Imposing the duty to conserve upon privatised water companies reinforces their requirement to take all practical measures to minimise the need for abstraction of water from the environment. In this sense the duty is properly placed on water companies. However, this responsibility should have been additionally placed on other abstractors, for example power and agricultural sectors.

We welcome the duty to conserve placed on public bodies and we are expecting the impact of this measure to become significant. For example Three Valleys contacted all local authorities within its supply area and has been very pleased with the enthusiastic response by some of those authorities in sharing water conservation messages to the shared customer base.

The water economic regulator (Ofwat) has recently taken on the new duty to promote sustainability. It is too early to test the extent to which this has been embraced. An issue that may need to be addressed is the approach to be taken where the most economically viable solution is not the sustainable solution. This will test Ofwat’s adherence to the new duty.

How does water figure in the development of Government policy in areas such as housing, land use planning and industry?

Recent evidence suggests that in some instances the provision of public water supplies has not been given a high enough priority in the development of Government policy in relation to housing developments.

Water companies are not statutory consultees in the planning process, and so, for example, water use in new development does not seem to be fully considered as part of planning approvals. This should be changed.

What can the UK learn from the experience of other countries?

The UK water industry leads the world in much of what it does. At the same time, the UK can learn from the experience of other countries with regard to managing demand through metering and tariff systems. In places like Singapore and Holland customers receive bills showing consumption profiles in charge bands, with advice as to how bills could be reduced by changing water use, habits, patterns etc. We seek to learn from such experiences, as we inevitably move towards a society that will have to value water more highly, and pay for it on a more rational basis.

October 2005

Memorandum by Waterwise

INTRODUCTION

Waterwise is a new organisation which aims to increase the role of water efficiency. Waterwise is an independent organisation, which was set up by the UK water industry to promote water efficiency through co-ordination of existing initiatives and through the development of collaborative projects.

Stress on water resources in the UK is increasing and is likely to continue to increase in the future. Water efficiency has a major role to play in ensuring the UK can meet future demand for water, whilst protecting the customer and the environment.

1. DEFINING THE PROBLEM

(a) What are the causes of the current problems of water supply, and how serious are they?

At present over 3 million water customers have some form of garden watering restriction in place. Water levels in reservoirs in the South East of England are below average and groundwater levels are well below average. Without substantially above average rainfall over the autumn and winter, the current problems will continue into 2006, with the possibility of more restrictions and the need for more drought orders to ensure public supply.
The problem is a lack of rainfall since November 2004. This is common across all of the western part of Europe. Spain and Portugal are suffering severe drought conditions and France and Italy are in a slightly worse situation than the UK. Even Southern Ireland is currently facing some water stress. The lack of rain has resulted in a lack of recharge, particularly of the Chalk aquifer that provides around two thirds of the water for public supply in South East England.

The current water stress has highlighted the fragility of supply in some parts of the UK, in particular in relation to how we deal with long-term drought. The current problems are in the South East of England but in recent years there have been drought conditions in Scotland and the North West and the majority of the UK is vulnerable to drought.

However, it is worth noting that the current situation has also highlighted the fact that the UK has a very good drought planning process and good links between regulators, Government and the water industry.

(b) What are the projections for future water supply, and what factors will influence these projections? Where, and over what timescales, will problems emerge?

Projections of water supply and demand are difficult to make as they depend on a large number of factors. However the key factors are, changes in per capita demand, changes in population and industry, the development of new supply, and climate change.

— Per capita demand for water has risen by about 1 per cent a year since the 1930s.
— Climate change is leading to greater uncertainty in rainfall patterns, which will probably result in more droughts and floods.
— New development and population growth is being predicted and even promoted, in the areas of highest water stress.

The timescale for problems to emerge is now. The current drought in the South East shows how unusual rainfall patterns, a lack of headroom in supply and a high demand can all lead to shortages. If the same rainfall pattern is repeated this winter, there will be more severe shortages next year.

(c) Is sufficient research being devoted to predicting, and handling, possible future scenarios?

There needs to be more work on demand-side measures. We need a better understanding of how and why people use water. However, in general there has been a lot of work on both supply and demand the main problem lies in dissemination and developing an action plan based on the research, there is a need for more collaborative projects.

(d) Is the response of Government, the EU, regulators and the industry adequate?

Government

The Government needs to implement the policy approach laid out in ‘Directing the Flow’ (Defra, 2002), which looks to manage water holistically. The Government also need to let Defra lead on water issues, for example: ODPM should have consulted more closely with Defra on the water implications for the Sustainable Homes initiative.

The Government should also provide the public with clear signals on water efficiency. This may involve increasing the use of grants to promote water efficient technology.

The Government should also give the water industry a clear steer on issues such as demand management, metering and water scarcity status. With regard to metering and water scarcity status the Government should aim to reduce the legislative hurdles and enable water companies to use compulsory metering as a tool to improve the supply demand balance.

Regulators

The water regulators should co-ordinate their actions on supply-demand issues, the Water Act 2003 clearly requires MoUs between regulators but these have not been developed and the regulators are often at odds. Demand management is a clear example where Ofwat and the Environment Agency have differing views.
EU

The EU do not generally have a direct involvement in supply-demand issues, but the recent Water Framework Directive gives a good basis for all water policy within Member States. One area where the EU could take action is to clarify State Aid rules in relation to capital allowances on water saving technology where their responses vary between Member States.

Water companies

Water companies have a statutory duty relating to water efficiency. These have recently been enhanced in the Water Act 2003 to cover the promotion of water efficiency. In general all water companies undertake a wide range of activity on water efficiency. However as periodic review cycles have sought to drive ever more stringent financial efficiencies from the companies, areas such as demand management have received reduced funding, and in many cases the financial regulator has rejected proposed increases in demand management work. At the same time the Environment Agency has been pressing water companies to increase the amount of demand-side measures. This has left water companies in a situation where there is an increasing requirement to carry out demand-side measures and at the same time a reduced level of allocated funding, in the last Periodic Review the Ministerial Guidance did not clarify the situation as it merely called for a conspicuous commitment to water efficiency.

As a result water companies have set up Waterwise as an independent organisation to promote water efficiency and to co-ordinate activities between companies themselves and between the industry and other bodies. The funding for Waterwise is in addition to their statutory spend. This commitment is a recognition that companies need to do more on demand-side measures and Waterwise will be encouraging companies to develop more extensive water efficiency plans.

Waterwise will also aim to build the economic case for the use of large scale demand management projects to augment supply-side measures. Waterwise is keen to ensure the companies start to increase the use of demand-side measures in water resource plans. However, we believe that the twin track approach is about simultaneous development of both supply and demand-side measures and that the two are not mutually exclusive.

2. Supply and Demand

(a) What are the options for increasing water supply and what are the arguments for and against?

There is a clear need to increase water supply in some part of the UK, notably the South East. The UK must start to actively pursue both demand and supply side measures now, as the planning horizon for a reservoir is at least 15 years. The worst case scenario is that no decisions are made and we run out of time and have to adopt less sustainable approaches meeting demand.

There are a number of options for increasing supply. These include building traditional reservoirs, building winter storage reservoirs, developing offline infiltration which allows high river flows to be infiltrated to groundwater, aquifer storage and recovery, desalination, wastewater reuse etc.

There is a very wide range of options available to water companies for increasing supply; however it should also be noted that much of the supply in the South East of England comes from groundwater and aquifer recharge is a natural process which is partly dependent on land-use.

There has been very little attention given to the impacts of development on aquifer recharge. Simply, if the ground is covered by impermeable surfaces water cannot recharge the aquifers and runs-off into rivers or sewers increasing the possibility of flooding. Therefore land-use planning has a role to play in maintaining water supplies.

Most of the arguments presented for or against specific resource developments are over-simplistic. Each development must be considered in sustainability terms, for instance a reservoir will have social, environmental and financial implications, all of which could be either positive or negative, depending on design and location. It is true to say that reservoirs have negative environmental impacts, but at the same time they have positive impacts to and a number of UK public supply reservoirs are now listed nature sites.

Waterwise supports the development of new supply resources, but we believe that water companies should integrate new supply with demand management projects more closely. We also believe that the Water Framework Directive offers the opportunity for more imaginative resource developments and that Government and regulators should assist water companies in developing multi-functional supply measures.
(b) **What are the likely future trends in water demand, and what can be done to manage demand more effectively and to influence the behaviour of consumers and others?**

Waterwise has been set up to facilitate a reduction in per capita demand for water within five years. This will rely on working closely with a wide range of partners.

Waterwise is currently gathering an evidence base to demonstrate the long-term sustainability and cost effectiveness of water efficiency measures. Based on current knowledge Waterwise believes that at least a 10 per cent reduction in per capita consumption should be achievable and sustainable. German per capita consumption is currently 125L per day (UK is 150L) and demand is falling by 2 per cent a year. Waterwise is currently in discussion with the German Government and water industry to determine the role that higher prices and full metering have had on demand.

The promotion of water efficiency in the UK requires a number of actions to be undertaken, for example:

- Agreement of a framework for funding of demand-side measures with the Periodic Review process.
- A clearer more accessible mechanism for promoting water efficient products, this could include expansion of the ECA water technology list, or VAT reduction for water efficient products, or the use of grants to promote customer water efficiency action.
- Greater dissemination of the information on water efficiency available for both the general public and industrial sectors.
- A greater focus on water efficiency from companies, including large scale pilots, but this links back to adequate funding.
- The promotion of water efficiency messages, this could be part of an education campaign to improve public understanding of water issues in general and would be in keeping with Article 14 of the Water Framework Directive.
- Better co-ordination of the existing work on water efficiency.
- A comprehensive study of international demand management.
- A better understanding of water use, including the sociological aspects.
- The development of a water efficiency labelling scheme.

Waterwise is keen to work with others to address these issues.

(c) **What contribution can science, engineering and technology make towards reducing water use or waste by households, business and the public sector?**

There are a huge number of water saving devices available in the UK. The issue is how to ensure they are used. Changes to the building regulations are part of the answer, but there needs to be a better mechanism for promoting the technology and ensuring that it is used appropriately.

We need to build houses that are water efficient, but water efficiency needs to be integral to the design. We need to make it easy for people to be water efficient and for water efficiency to fit with their lifestyle.

3. **Infrastructure**

(a) **What is the current state of the water supply and drainage infrastructure? Is there sufficient investment in its improvement?**

The past 15 years has seen massive investment in the UK water and wastewater infrastructure, but there is a need for further long-term sustained investment. Leakage is primarily due to the age of the network.

4. **Context**

(a) *The Water Act 2003 amended previous legislation in order to promote sustainability and water conservation. Is the legislative and regulatory framework, at National and European levels, adequate?*

A sound regulatory framework is only part of the solution. The UK needs mechanisms to deliver the requirements of the legislation. In some instances this means that a simplification or relaxation of regulation would actually promote water efficiency, such as in the case of Water Scarcity Status applications.
(b) **How does water figure in the development of both policy in areas such as housing, land use planning and industry?**

Land management and water management are inextricably linked. Building on catchments has an impact on groundwater recharge and river flow. Increases in population require increased water resources.

The ODPM’s Sustainable Communities Initiative has acted as a catalyst for the debate on the links between development and water. The new housing provides an opportunity to develop high quality water efficient homes.

(c) **What can the UK learn from the experience of other countries?**

The UK has a very good water resource and drought planning process, the regulatory regime in the UK is generally seen as a good model, and UK companies, both public and private are seen as providing efficient good service.

The area where the UK could learn from other countries is in the use of wide-scale demand management approaches and in the greater use of integrated catchment management.

**CONCLUSION**

Increasing demand, climate change and population shifts, along with an increased recognition of the need to protect the aquatic environment mean that maintaining sustainable public water supplies in the UK is not possible unless action is taken to both augment supply and reduce demand.

In many parts of the UK further economic growth could be constrained by a lack of water resources and in many parts of the UK environmental damage is already occurring because of the stress on water resources.

There is clearly a role for new resource development and this should include a range of novel storage and treatment solutions. The fact that Water Resource Plans will require statutory consultation will allow a wider debate over resource development, however at the same time building new resource takes time, so the planning process should be clear and swift.

Alongside new resource development it is critical that the UK arrests the rise in per capita consumption and develops large scale water efficiency programmes. Whilst there is a need for a more robust economic case for demand management in the UK, there is no question that the approach will work at the large scale as many overseas examples demonstrate.

The Government, water industry and regulators are all making positive moves towards developing a consensus on demand management; there is now a need for a more comprehensive action plan to deliver the improvements in efficiency.

*October 2005*

**Memorandum by D G Wilks**

**The Problem**

Global warming is causing climate change, bringing to an end a period of relative climatic stability and predictability. Our weather systems now have to dissipate an additional five Hiroshima bombs worth of energy every second, due to the enhanced greenhouse effect. This rate of energy input is increasing exponentially as positive feedback begins to occur. Examples of positive feedback are: Reduced reflectivity of the earths surface due to glacial and ice sheet melting and diminishing winter snow coverage; Melting of arctic tundra for the first time in 11,000 years, leading to massive methane release (Methane being twenty times more potent than Carbon dioxide as a greenhouse gas); increased amounts of water vapour due to higher global temperatures. However, the worst positive feedback loop has yet to kick in; Frozen Methane hydrate on the seabed continental shelves contains more carbon than in all the coal, oil and gas reserves put together. Some estimates say twice as much, others one hundred and fifty times as much, it has been building up for millions of years. If humanity is not extinct before this melts, it certainly will be after. A major extinction in the Pliocene epoch, 12 million ago, is now thought to be attributable to a mass release of methane from the melting of frozen methane hydrate and took only twenty years from start to finish. A two or three degree rise in sea temperature is all that it will take and sea temperatures are rising throughout the water column and not just at the surface as previously thought. Plus, Carbon Dioxide levels will increase with the industrialisation of the developing world and a global increase in car and air travel.
Global warming runs the real timetable and it is running much faster than our human response timetable. Eighty per cent of all human activity goes on within coastal regions. Noting the effect on fuel prices and the world economy from the loss of oil refinery capacity on the US Gulf coast last year, due to the worst hurricane season ever, what will be the effect of a seven metre rise in sea levels? Humanity must marshal all its resources now, while we still have control over them, if we are to beat global warming. Professor Lovelock reckons that the war on global warming is that it will be a war fought with ideas and not-bombs and bullets, although shooting wars will also be a consequence as nations begin to fight over diminishing resources.

The battle to save our water resources is but one battle front in the war against global warming and if humanity does not fight as though it were a war, then we will lose.

**Supply and Demand**

Both supply and disposal of water have been designed according to historical rainfall patterns. These rainfall patterns gave rise to established ‘average rainfall figures’, which were and still are used to determine reservoir capacity for a particular catchment area and pipe sizes for drainage, sewage and storm water. These ‘average rainfall figures’ are now useless and here lies the problem.

A deficiency in reservoir capacity will lead to water shortages and small drainage pipe diameters will lead to sewage flooding in heavy downpours. The obvious remedy is to increase both but as this will be a near financial, planning and civil engineering impossibility, with very long time scales, it is a non-starter for the immediate and short term.

Desalination plants have been proposed but they are energy and capital hungry, with the environmental downside of waste disposal of the salt by-product. There is another major problem with desalination, as yet, not touched upon by its proponents. Desalinated water is really de-ionised, produced by forcing saline water through a membrane, under very high pressure to remove all the ions, eg Na+ and Cl. Now pure water, without any dissolved ions is quite corrosive, it wants to dissolve anything it comes into contact with, especially metals like iron. In Saudi Arabia, they first tried to build their thirty plus desalination plants with ordinary mild steel pipes. The deionised water basically dissolved them. All pipe work had to be replaced with stainless steel, an expensive exercise in itself, but this is not the real problem. Thames water, in common with many of our water companies, still has one third of its pipe network made up of ductile iron, over one hundred years old. Feeding deionised water into this network will dissolve it in no time and send leakage figures soaring, more than nullifying any increase in water supply capacity. Perversely then, desalination may lead to wasting more water than it saves.

Sinking more boreholes into ancient aquifers appears to be a short-term fix but these have longer-term problems. Ancient aquifers have taken thousands of years to accumulate, taking water from them is akin to mineral mining, once they have gone they are gone. Increased pumping depths also means increased energy use and cost. Also, as fresh water is removed, water in the surrounding rocks permeates through to equalise the pore water pressure. Water from surrounding rocks may be contaminated with leachate from old tips and past industries. Birmingham is sat on lots of water but it is contaminated. They actually have a problem with a rising water table, which is flooding cellars etc. The furthest inland point in Britain is only seventy miles from the sea so salinification due to over abstraction is another problem, especially in coastal areas. India and many other countries are experiencing this problem now. In the short term then, there is little scope for improvement on the water supply side.

The immediate solution, therefore, lies with demand management, resource or water efficiency, reducing per capita usage or just plain old saving water, not using as much in the first place. It is noticeable that the water companies postulate a ‘twin track approach’, water supply on one track and demand management on the other. However, it is an approach used by some as a defence mechanism, to mask their indecision and inaction because when the heat gets too much on one track, they just switch to the other track and talk about that. The result is much talk but very little effective action. Let’s face it; water companies are in the business of selling water, not saving it. The only time they want to save it is when they have not got enough to sell. This is why they like water restrictions like hosepipe bans, that they can turn on and off and hate permanent water saving devices like the Interflush. All the water companies have known about the Interflush for well over a year now, many have a kit sat on their desks and they have done absolutely nothing about it, they see it as a threat to their profits. It is notable to see from the evidence so far presented to your committee, that not one body has mentioned the Interflush, though most know about it, the biggest water saving device in over a century. I enclose a letter to Elliot Morley, which still remains unanswered.
THE SOLUTION IS THE INTERFLUSH

The Interflush can reduce per capita water use, permanently, by 25-30 litres per day, costs about £10 per kit and takes about 10 minutes to fit. The Interflush is the only device, which can make the necessary, massive and immediate impact now, this year, on the looming drought.

Toilet flushing accounts for around one third of household water use and over 90 per cent for office based businesses. The Interflush can save half of this, 47 per cent as proved in Defra trials at Herriot Watt University. These trial results being instrumental in obtaining a relaxation in the water regulations to allow interruptible flushing.

The Interflush is a retrofit kit, which attaches to single flushing WC siphons and connects to the flush handle spindle, front mounted, to convert them to interruptible flushing. The Interflush places an air valve on top of the siphon, which is closed when the handle is held down and opens when the handle is released. Press, hold, release, all in one hand operation with no room for operator error. Each flush uses exactly what is needed to clear the pan, no more, no less. This is why nothing can flush a toilet with less water. It makes all other flushing systems obsolete because they all flush fixed volumes of water, as they have done for the past one hundred and fifty years or so.

A crucial aspect of the Interflush is that it only fits and works on siphons and not valve-flushing devices, either drop valves or flap valves. The siphon is the only flushing device that never leaks, yet, it has been displaced from the rest of the world by valves, which have been known to leak for over a hundred and fifty years. Thomas Crapper invented the siphon back in the 1860s and named it the ‘Water Waste Preventer’, on account of it replacing leaking valves which were water wasting. This resulted in valve flushing being outlawed and siphons being the only flushing device allowed in British cisterns.

However, in 1999, knowing full well that valves leak, they were made legal again. In the USA, where all they have ever had is the valve, the American Water works Association estimate valve leakage to be between 15 and 30 litres per person per day. If Britain does go ‘all valve’, then we can expect the same leakage rates and our water companies will have to find an additional 5-10 per cent more water resource just to make up for valve leakage. How can this be compatible with government policy on sustainability? Even the water regulations testing criteria had to be redrafted to allow for their propensity to leak, one in five test samples can leak and still get full WRAS certification.

Bad enough that valves were made legal again but the rate at which they are replacing siphons is both being accelerated and subsidised with taxpayers money via the Water Technology List (WTL). In the low flush toilet category 41 out of 44 products are push button operated, dual flush toilets, all with valve flushing and all made by American Standard Plumbing UK. Now, a siphon cannot be primed and started with a push button, they need a flush handle to give the required leverage to lift the priming water. It is notable that all these toilets on the WTL do not have a hole in the front of their cisterns so that a siphon cannot. once purchased, the owner is locked on to buying replacement valves to cure the leaks, as intended by the valve and ceramic manufacturers. In a conversation with a chief executive of one of the largest valve manufacturers in the world, I asked, ‘But don’t these flush valves leak’, the reply was ‘Of course they leak, that’s why we sell so many’. Valve toilets in America are operated with a flush handle so they could be here. The missing cistern hole is a deliberate attempt to exterminate the siphon in Britain, its last refuge and if it goes from Britain, then it is gone from the world for good, the only flushing device that never leaks.

However, the WTL is not the only waste of taxpayer’s money. Through the ‘Decent Homes’ program, much more money is being wasted. Social housing bodies throughout the land are throwing out, good, leak free siphon toilets and replacing them with leaky valve toilets, leaving the tenants to pay for the leakage. In 2004 almost one in five households owed money to their water companies, a figure set to rise with increases in all utility bills. The water companies were the single largest user of the court system, with almost 250,000 claims.

Only the Interflush can stop and reverse this valve-flushing juggernaut. At around £10 per toilet plus fitting, say a further £10, the Interflush is the cheapest, fastest way to permanently save the maximum amount of water now. The Interflush also saves having to fit new toilet suites providing further savings and helping to curb carbon dioxide emissions. Ceramic ware is in a gas fired kiln for 20 hours at 1,400°C.

UK SAVINGS

- Water = 640 million m3; Energy = 580 million Kwh; CO2 reduction = 260,000 Tonnes
- Enough water to supply 5 million new homes.
- Consumers would save £1.2 billion per year if all on meters.
— Save 15 per cent–20 per cent of UK & world water resource, 5 per cent–10 per cent from using the siphon and not having the valve and a further 10 per cent from using the Interflush.
— Cut water bills by 20 per cent for households and 42 per cent for businesses.
— Could save 10,000 lives each year by early detection of colon cancer, second biggest cancer killer in UK and first in Europe. 90 per cent treatable if caught early, one of the most treatable of all cancers.

COMMERCIAL ASPECTS

I currently hold worldwide patent rights on the Interflush but at £3,000 per country, if I do not secure enough sales revenue to fund this, then those rights will lapse. The Society of Inventors and Patentees estimate that Britain loses £176 billion each year through our competitors taking advantage of lapsed patents on British inventions, the MP3 player being a recent example. I am doing all that I can to prevent the Interflush from joining them. There are about 60 million toilets in Britain and a further 3,940 million in the rest of the world. The Interflush can save between 15 per cent and 20 per cent of the industrialised world’s water resource, 5–10 per cent from changing from the valve to the siphon and a further 10 per cent from using the Interflush. With horrendous drought predicted for Europe again this year, France is now actively considering switching to the siphon. Here is a technology where Britain has the lead, a technology that the world is desperate for. A government backed national retrofitting campaign for the Interflush is the solution to just so many problems and I am open to suggestion on how this can be accomplished, a PFI initiative, anything.

The ‘Long Wave Theory’ as put forward by Kondratiev speaks of necessity being the driver for spawning new industries and prosperity, based on the adage ‘necessity is the mother of invention’. There can be no greater driver than the need to survive. Global warming can and must spawn new industries. Global warming is an economic opportunity; at 8 per cent per year, the fastest growing business sector in the UK is the environmental sector. The Interflush has massive commercial potential. It is the very essence of sustainability.

It is fortuitous that your committee is sitting at this time and I would be honoured to present my working demonstration model to you and to answer any questions that you may have.

February 2006