

The provision of water to meet Medway's future needs



July 2007

Regeneration and Development Overview and Scrutiny Committee

Provision of water for Medway's future needs

FOREWORD



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On behalf of the Committee, we very much welcomed the opportunity of leading a review of this important current topic in Medway. If the proposed development in the South East of England of at least 29,000 dwellings per year until 2026 proceeds as planned there will be a very serious impact on the water supply in Medway. If climate change continues to give us more dry winters, this could cause further summers with possible hosepipe bans and more problems for wildlife and greater environment stress.

This review could have been extended into many other areas of interest but Members wished for any findings and recommendations to be able to inform a South East Plan public examination (which will establish the number of houses due to be built in the next 19 years.) By consulting the experts, it has been possible to draw firm conclusions and make recommendations, not only to the South East Plan but also to other authorities and organisations to hopefully influence their plans and decision making in the future.

We would like to thank all the witnesses for their information and advice and the Council employees for their knowledge, time and support in compiling this report.

***Councillor Roy Hunter (Chairman),
Councillor Paul Godwin and Tony Luckhurst (Ex-Councillor)***

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SCOPE OF THE REVIEW

Context

With the imposition of drought orders and high levels of housing growth projected for the future, there is considerable debate across the South East of England region about whether water supplies are adequate and how robust the response from the water industry is. However little work appears to have been carried out to examine the specific circumstances in Medway and what response is required to ensure future needs are met.

Some background work has been carried out 'in house' by the Council but a number of lines of enquiry could be usefully followed with the aim of informing the Council and the local community as to what is planned and whether that response is adequate.

Terms of Reference

The following terms of reference were agreed in order to determine whether adequate plans and associated resources are in place to meet Medway's future needs for drinking water, taking account of planned growth in Medway and the surrounding area.

1. Review the existing water supply position in Medway by obtaining evidence from appropriate sources; including the identification of supply sources, local consumption per head of population, historical issues causing strain on the supply network such as leakage rates and wastage.
2. Examine potential future needs and in particular increased demand likely to arise from future housing development in Medway and other areas from which Medway's water supply is sourced
3. To identify plans for water conservation measures, including reduced leakage, changes to the Building Regulations, the effect of water efficient domestic appliances, grey water systems, retrofitting in existing dwellings etc., and the likely effect of these measures
4. To review Southern Water's current Water Supply Plan, including obtaining views on it from OFWAT and the Environment Agency
5. To review work being carried out at the regional level to plan for future water supplies, particularly the work co-ordinated by South East England Regional Assembly (SEERA)

6. Seek to identify and assess the robustness of climate change assumptions, resilience measures and any contingency planning employed collectively by the water industry
7. Determine the likely adequacy of planned measures to maintain and increase supply, having regard to the factors set out above

The review should be carried out in three main sections:

- The current situation – whether it is adequate. What, if any, are the current deficiencies. When problems are likely to occur if new sources of supply do not come forward.
- The future needs of Medway and are there sufficient plans in place for those needs to be met (eg. how many houses will be built, when this will occur, when the new water supplied is needed and whether the plans to provide it are adequate and robust.)
- Whether the solutions are environmentally sustainable and whether the right assumptions are being made about efficiency savings and climate change.

If considered appropriate at the completion of the review, a set of recommendations will be drawn up for consideration by the Council and the relevant agencies and companies responsible for water services in the area.

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HOW THE REVIEW WAS CARRIED OUT

At a meeting of Medway's Regeneration and Development Overview and Scrutiny Committee on 18 July 2006, the Committee agreed to carry out an in-depth review on the provision of water for Medway's future needs. The reasoning for commencing this review is set out in the next section.

A list of potential expert witnesses were contacted and invited to come and meet the Committee to share their experience with the Members and answer questions. The witnesses were chosen for their knowledge of the water industry, the environmental aspects of how drought conditions can affect wildlife, the influence they may have on the house building industry and water saving devices and considerations. Officers from Medway Council were asked to attend in their roles as development control officers who consider planning applications and draft planning policies, for their expertise in building control and as negotiators with developers about large building projects and energy saving measures carried out within the Council.

Representatives from OFWAT (The Water Services Regulation Authority), SEERA (South East England Regional Assembly), UKCIP (UK Climate Change), Homebuilders Federation, University of Greenwich (Head of Earth and Environmental Sciences), English Nature, Kent Wildlife Trust, Greenpeace and Friends of the Earth were invited as witnesses for the review but either did not respond or declined to attend.

Meetings of the Committee were held to take evidence as follows:

Date	Venue	Investigation/attendees
26 September 2006	Civic Centre, Strood	Introductory meeting to discuss the issues and background to the review Meeting with Medway Council officers: Brian McCutcheon, Local and Regional Planning Manager Brian Geake, Senior Planner Jennifer Mentz, Planning Assistant Caroline Salisbury and Rosie Gunstone, Overview and Scrutiny Co-ordinators

1 November 2006 (Evidence session 1)	Civic Centre, Strood	Water regulations and monitoring invitees. Members: Councillors Bacon, Davis, Hunter and Luckhurst Nigel Hepworth, Principal Water Resources Planner from the Environment Agency
7 November 2006 (Evidence session 2)	Highland Park development in Ashford, Kent	Councillors Bacon, Baker, Davis and Godwin attended the new 'Highlands Park' Hillreed development in Ashford about the 'Savings on Tap' project
13 November 2006 (Evidence session 3)	Civic Centre, Strood	Medway Council building, regeneration and development plans officers Members: Councillors Andrews, Bacon, Baker, Godwin, Tony Goulden, Hunter and Luckhurst John Finlayson (Medway Renaissance), Brian McCutcheon (Local and Regional Planning Manager) and Tony Van Veghel (Building Control Manager) in attendance
22 November 2006 (Evidence session 4)	Civic Centre, Strood	Environmental, nature and wildlife Members: Councillors Bacon, Baker, Godwin, Hunter and Luckhurst Graham Warren from CPRE (Campaign for Protection of Rural England) in attendance
30 November 2006 (Evidence session 5)	Civic Centre, Strood	Southern Water Members: Councillors Bacon, Baker, Godwin, Tony Goulden, Hunter and Luckhurst Meyrick Gough, Water Planning and Strategy Manager, Southern Water in attendance

6 December 2006 (Evidence session 6)	Civic Centre, Strood	<p>Energy efficiency</p> <p>Members: Councillors Baker, Godwin, Tony Goulden, Hunter and Luckhurst</p> <p>Alistair Sutherland, Natural Resource Institute and Ieuan Edwards, Medway Council's Senior Research and Review Officer (energy efficiency)</p>
9 January 2007		<p><u>Overview & Scrutiny Committee meeting</u></p> <p>First draft of findings and recommendations of the review were considered by the Committee</p>
12 June 2007		<p><u>Overview & Scrutiny Committee meeting</u></p> <p>Consideration and agreement of final draft before publication and consideration by the Cabinet</p>

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KEY FACTS AND ISSUES

The current situation

Water is a basic essential of life. Our health depends on us having access to enough clean drinking water and water for sanitation. Whenever water is taken for public water supply or other uses this has an impact on the environment. Increases in demand for water mean that resources are coming under greater pressure.

In many parts of England there is less water per person than in most Mediterranean countries, and parts of the South East have less water per person than the Sudan or Syria. In some parts of England, the density of the population, combined with a significant or growing demand for water, places real stress on the environment.¹

The water companies that supply Medway and have a bearing on the maintenance of future supply are Southern Water (the principal supplier), Mid Kent Water and Thames Water that principally supplies London's demands. Water companies have previously been statutorily required to submit to the Environment Agency (EA) plans to show how they are to provide sufficient water to meet their customers' needs while protecting and enhancing the environment. In the future, these plans will be submitted to the Department for Environment, Food and Rural Affairs (Defra) and the EA will be a statutory consultee.

All the water companies in England and Wales are considered by the regulators to be able to meet their customers' needs over the next five years or so without recourse to restrictions. Into the future, there is concern that many plans are dominated by the development of new resources with ambitious timescales for implementation. That is, they are planned for coming on stream from 2015.

In practice there is a strong consensus that all three of the following options have to happen in order to continue to meet customer's future needs:

- new resources – reservoirs, new groundwater, re-use of waste water, desalination
- leakage reduction
- efficiency measures – reducing demand

Medway is currently consuming between 38 and 42 million litres of water per day (Ml/d) from groundwater (the chalk aquifer) administered by Southern Water Company, who also provide an inter-company bulk supply of up to 4 Ml/d from Medway to Folkestone and Dover Water Company between September and December to remedy a deficit in supply in that area.²

¹ Extract from Environment Agency "Identifying areas of water stress" consultation – January 2007

² Southern Water Draft Drought Plan for Consultation – March 2006

Southern Water has predicted future growth in demand across its area from population changes based on the 2001 census data and the growth in Medway resulting from the Thames Gateway development. To meet the increased future demand, some further increases in groundwater abstraction is planned, though the majority of new supply is reliant on the expansion of Bewl Water reservoir near Tunbridge Wells and the creation of a new reservoir at Broad Oak near Canterbury. If Broad Oak reservoir comes on-line as planned (between 2019-2030), it would no longer be necessary to transfer groundwater from Medway to Thanet, therefore releasing further supplies for Medway. It was accepted that the new reservoir options at Broad Oak and enlargement of Bewl Water would serve a future demand from a wide area and not just Medway.

Southern Water forecast an increase in overall demand (including an allowance for losses) of up to 700 Ml/d by 2030 across its area that includes Kent, East and West Sussex, Hampshire and the Isle of Wight. In Medway, Southern Water assume consumption will not change from the present 150-169 litres per head per day between 2003 and 2030. This is because Southern Water believes it can maintain the supply and meet the needs of an increased population by improved leakage control and an increase in efficiency savings.

Medway's water supply would appear to be under stress over the period 2008-2010 and SEERA's work concludes that the Medway area will have a deficit of between 1 and 4 Ml/d by 2025, assuming the construction of Broad Oak and Bewl. Into the future the situation is likely to be exacerbated with one of the remaining resource zones in the company's area being in deficit by 2010, another by 2013 and two more by 2018 giving a total of seven out of the nine resource zones being under stress by 2018.

Current sources of supply for the Medway area are:

- Pumped groundwater – this is drawn from the water table, the level in the ground below which all pore spaces and cracks are filled with water. When rock formations yield usable amounts of water they are called aquifers. Currently 70% of Medway's water is supplied from groundwater
Groundwater supplies are the slowest to recover from drought conditions
- Surface water (reservoirs) – currently supply 30% of Medway's water
- Some Medway groundwater is currently piped to Thanet
- Groundwater supplies can be supplemented by Bewl Water Reservoir as there are no further ground water resources to exploit in Medway
(The number and size of private abstraction licences directly affects the size of the available supply.)

The degree to which climate change will affect the ability of groundwater supplies to re-charge, the development of the new reservoir capacities and the need to maintain river flows to meet the appropriate European Directive has not been made explicit in Southern Water's resource plans. The balance between the planned supply and predicted demand is shown to be very sensitive and it follows that resource planning will have to be successful to ensure supply into the future. The validity of the underlying assumptions for the planning of new and the maintenance of existing resources are open to enquiry.

Key players and their responsibilities

- **DEFRA** (Department for Environment, Food and Rural Affairs) – overall responsibility for water, providing the legislative and statutory frameworks within which the various regulatory bodies and water companies operate
- **OFWAT** – the water industry regulator whose duties include setting price limits on what companies can charge, ensuring that water companies carry out their statutory duties and encouraging companies to be more efficient
- **SEERA** (South East of England Regional Assembly) – considers and agrees the South East Plan which decides how many, and where, houses will be built in the region by 2026. This consideration takes into account the availability of and effect on natural resources, including water
- **Environment Agency (EA)** – responsible for the water quality of water bodies, water provision and the management of water resources through abstraction licences and discharge into “controlled waters”³
- **Southern Water** – Medway’s main water supply company
- **Campaign to Protect Rural England (CPRE)** – an external organisation which has written a detailed document entitled “A Water Resource Strategy for Kent” (the author had previously held a senior position at the Environment Agency for many years.) CPRE exists to ‘promote the beauty, tranquillity and diversity of rural England by encouraging the sustainable use of land and other natural resources in town and country.’

Water companies, the EA and OFWAT must identify, find and deliver necessary water supply and wastewater treatment infrastructure and reach cost effective leakage levels.

Potential new supply sources

The increasing demand in the South East, including Medway, is to be met via a combination of increased resources (reservoirs), increased efficiency, increased transfer capacity and leakage control. The EA state that the water companies have taken climate change into account when making their predictions for resource development to ensure supply meets demand and that all environmental responsibilities have been met.

Current proposals:

- Bewl Water reservoir is proposed to be enlarged which will improve the capacity over a wide area. It currently holds 31 thousand, million litres and would be increased to 46 thousand, million litres
- There is a proposal to build a new reservoir at Broad Oak which has the potential to serve Thanet with resulting water savings for Medway - but certain groups have raised concerns over whether this reservoir will be built, especially to the proposed timetable

³ “controlled waters” – part of the hydrological system that could form the basis of potable supplies and necessary for the ecology of the area

- There is also a proposal to extend Darwell reservoir in Sussex but this will not happen within the next 25 years
- Water from London - this is dependent on the construction of a reservoir near Abingdon in Oxfordshire (Thames Water region) – waters released from here back into the rivers could act as a South East grid for water. The EA are encouraging companies to seriously look at this option but Southern Water reported that this was not an option they are considering.

Southern Water appears satisfied that provided there is the implementation of the plans for the reservoirs, supply to meet the predicted demand in the Medway area will be achieved over the projected plan until 2030. It's current resource plan sets out to develop an additional 19.4 MI/d in the Medway zone over the next 25 years.

However, no details of any modelled seasonal rainfall variations due to climate change have been made public. The potential weak element in the company's predictions are to what degree sufficient scope is built into their calculations for rainfall variation due to climate change that would impact on river flows in the water courses that feed the Bewl reservoir (the Rivers Teise, near Crowborough and Medway) and the proposed Broad Oak reservoir (River Stour) and other surface abstractions. This element underpins Southern Water's plans.

Broad Oak is scheduled for commissioning in 2018/2019 but CPRE are of the following view:

that flows in the River Stour will not be sufficient to support the rates of abstraction required to sustain the design yield of 40 MI/d. The 1990/1991 proposal was abandoned in recognition of the special conditions imposed by the regulator to protect environmental and water use requirements. 15 years on and with European Directives imposing even tougher environmental targets, there is even less likelihood of a successful promotion; in light of field evidence pointing to a progressive decrease in the average annual flow of the Great Stour river above Canterbury. The trend suggests that by the time Broad Oak is constructed, there will be virtually no natural spring flow entering the river between Wye and Canterbury during late summer. Even assuming a successful commissioning of the Bewl reservoir enlargement (scheduled for 2014/2015 with design yield of 14 MI/d) the combined impact of demand growth, climate change and new European Water Directives (target date 2015), will leave Kent with substantial resource deficit; probably in excess of 20MI/d. This is estimated to double by 2026.

Kent County Council's Select Committee 'Water and Wastewater, particularly in Ashford' (September 2005) reported concerns about the robustness of planning for phasing and funding these large infrastructure developments and that some proposed schemes, such as Broad Oak, may not be viable. At that time, Mid Kent Water told the Committee that the timetable to bring Broad Oak into operation is "tight". There had been two unsuccessful promotions of the site as a reservoir during the last 25 years, the more recent of which in 1989/1990 was "withdrawn in the face of objections relating to the impact on the flow regime and quality of the river below the proposed intake," and environmental legislation is stronger now than then.

The Environment Agency in its publication 'underground, under threat' in 2006 stated:

'In some parts of the country people take and use a lot of groundwater. In the future groundwater is likely to be under even more pressure from more homes being built in the driest and most groundwater dependent areas.

It is tempting to think that the answer to water shortages caused by new housing is to build more reservoirs, but this is not always the right option in the long term.'

Housing demands in Medway

SEERA (South East England Regional Assembly) acknowledges that the South East of England is one of the driest parts of the country and in some areas the existing balance of supply and demand is very sensitive. The Environment Agency (EA) also states in its document "Maintaining Water Supply" July 2004 that various water companies in England and Wales have "resource deficit zones" and "low available headroom" regarding supply and resource development and management.

The regional ability to accommodate the anticipated housing growth is reliant on the sustainable and timely provision. A twin-track approach to water management will continue to be required – managed demand and increasing stored capacity.

Anticipated growth:

- estimated housing growth of 29,629 houses per year across the South East region which began in 2002 and will result in 800,000 new homes by 2030
- the Draft South East Plan 2006 (Policy H1) reduces this level of growth to 28,900 between 2006-2026 giving a total of 578,000 for the region. (If this is projected to 2030 a total of 693,600 new homes would be developed)
- in Medway, there are 3,900 new homes predicted to be built between 2006-2011 and 4,100 between 2011-2016, although the complexity of the regeneration sites may mean higher figures subject to the provision of the necessary infrastructure and services in accordance with an agreed development strategy for each site
- The pressure on the water companies will not just be from additional housing and climate change, there will also be further demand from large employers and industry. For example, it is considered likely that Medway Council will seek employment areas, including industry, at Kingsnorth and on the Isle of Grain.

Key Issues for this review

- Are efficiency saving assumptions realistic (8-21%) and how will they be achieved? (as produced for SEERA in consultation with Southern Water)
- Will the new Broad Oak reservoir meet expectations - will it be built and if so by when?
- Are current assumptions about private abstraction realistic?
- What are Medway's leakage rates - past and present?
- How much resilience/contingency is built into Southern Water's plans?
- Is this sufficient given climate change? (It is widely accepted that there will be an increase in rainfall during winters but a decrease in summer, however the change in rainfall levels remain uncertain, especially as there have been two consecutive 'dry' winters in 2004 and 2005)
- How will the forecast deficit between 2008-2010 be dealt with?
- What are the implications for future growth in Medway?

It is a reasonable assumption; given there will be at least 16,300 new homes in the Medway area by 2026, that there will be an increase in overall water consumption. Leakage control and efficiencies alone are unlikely to be able to reverse this trend although the increases do not appear to be critical compared to the planned supply, if new resources are implemented in time.

At present the Medway area consumes approximately 38MI/d to 42 MI/d of water per day. This is equal to approximately 397- 440 litres per day per household. If the present consumption rate remains the same whilst the area is developed, consumption could be as much as 45-50 MI/d by 2026 with the increased population. If this is reduced by greater water efficiencies (for example 8%) across the total housing stock, old and new, this demand may be reduced to around 41-46 MI/d.

Efficiencies greater than 8% may be possible in new developments and increased fitting of more efficient systems in existing domestic and commercial properties may also be possible. However there will be practical and economic limits beyond which there are diminishing returns in efficiency terms.

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EVIDENCE

Climate Change scenarios

Current climate change scenarios are based on the 2002 UK Climate Impact Programme (UKCIP) model. More detailed revised UKCIP models are expected in 2008. It is widely accepted that there will be an increase in the frequency and intensity of rainfall during future winters and a decrease during the summer, however the change in rainfall levels remains uncertain. This includes a risk of more extreme weather that could mean occasional drier winters that could have implications for reservoir refill and groundwater recharge. There is also the possibility of intense rainfall over shorter periods than previously experienced that could result in the flow rates in the rivers being high and of too short a duration such that it cannot be harnessed to fill the reservoirs before flow rates recede again. Similarly high run off rates, due to more intense and shorter rainfall periods could have an adverse effect on the recharge rates of any ground water resources.

As a result, greater headroom (supply available over expected demand levels) will be needed to maintain supplies in extended summer peaks, however, more water should be available to replenish resources during the winter. Despite this, a House of Lords Science and Technology Committee inquiry (reported in June 2006) recognised that the implications of climate change are not being adequately factored into long-term water management plans.

In terms of the South East Region, the Council is one of the furthest east and therefore one of the driest areas. This is because most of the Atlantic rainfall falls in Ireland, Wales and the west country and also further north. London stores most of its water in reservoirs in Oxfordshire which is pumped across to supply the capital's population via the London Ring Main. Medway, at the end of the country's rainfall supply, has no reservoirs within its boundaries but does use Bewl Water for some of its supply. However it has a high reliance on groundwater (about 70%) that takes longer to refill in times of drought.

There are indications of increasing stress in relation to the supply situation such that the Committee's investigation indicated that Medway may be in the worst position in the region with regard to the future availability of water.

Current water supplies

Current water supplies for Medway depend on about 30% from surface water (reservoirs) and 70% from groundwater, as confirmed by Southern Water and the Environment Agency.

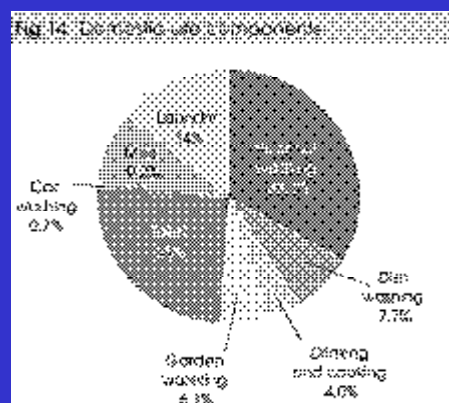
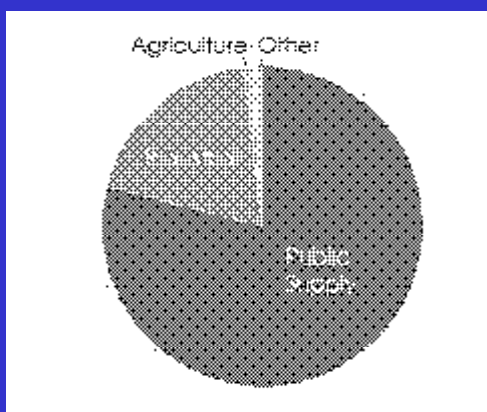
Southern Water brought Lower Bush and Windmill Hill groundwater supplies back on-line, pumping a total of 8 MI/d in response to the drought during the summer of 2006. They have also provided additional treatment at Throwley, Chatham, Kettle Hill, Burham and Rainham Mark, giving a total of 15 MI/d.

“Groundwater supplies are deemed to be at their licence limit.”

Southern Water

National figures¹:

How we use water



79% - Public Supply, 19% Industrial 1% Agriculture and 1% Other

Potential new water supplies

The Committee asked for clarification of Southern Water’s preferred option(s) and these were clarified as bringing on-line a source at Chatham and then the raising of the level at Bewl Water by 2014/2015 but if any options become cheaper and/or more sustainable then those may go ahead instead.

Expansion of Bewl Water Reservoir

Campaign to Protect Rural England (CPRE): “It has not been possible to fill the reservoir (at Bewl) at the moment (November 2006) during the drought order, therefore it would not be possible to fill up an extended Bewl Water, so again this facility would fail. This was an over ambitious undertaking by water companies as it could not be sustained during drought conditions.”

¹ Table supplied by Campaign to Protect Rural England – A Water Resource Strategy for Kent. The figures show use in England

Southern Water, however, has since stated that they do not expect it to be full at the end of each winter period. The critical draw down of the reservoir is currently some 18 months. The advantage of the raising of the reservoir is that it allows Southern Water to store more winter water, which will last a longer period.

Building of a new reservoir at Broad Oak, Canterbury

The Committee was not given specific details of the proposals for a new reservoir at Broad Oak, as this was a development by Mid Kent Water. However, it was noted that any new source would have to be backed by the regulator and the final outcome would be decided by the Secretary of State.

Previous problems with plans to build a reservoir in this location are detailed on page 16.

A smaller reservoir at Broad Oak might prove more cost effective and environmentally sustainable if fed partly from winter flow in the River Stour and partly by treated waste water. This option would cost no more than that incurred in current practice of treating and discharging the same quantity of effluent to sea.

CPRE

Alternative supply options

“Alternative solutions seem possible. The solution is not dependent on one thing happening.”

Environment Agency

- Bulk supplies/transfer of water from other areas

The Environment Agency stated: ‘in future options, we encourage more integration across the water companies supply areas, which is relatively un-integrated in the south east. We feel integration will provide better flexibility to cover events in the future. In terms of future options and longer-term maintenance, we are encouraging companies to seriously consider the possibility of transfer from London (and so directly or indirectly from Thames Water) to benefit the Medway catchment area.’

However, Southern Water reported that there is only a limited network of pipes linking different parts of Kent with each other and with other areas outside the county, so that currently it is difficult to move water between zones. Work is beginning between the water companies to transfer water but is in the very early stage of construction.

- National Grid

Southern Water asked the Committee to note that one cubic metre of water weighs one tonne and therefore requires a lot of energy to pump. This has to be considered alongside the government's targets to reduce the carbon dioxide footprint. To develop a national grid has been estimated to cost £8-10 billion and to transfer water from Wales has been estimated at £5-6 billion and both of these options are therefore too costly.

- Re-use of waste water

"Approximately 2000 million litres of waste water (about half the total quantity processed by Southern Water) is treated and pumped to sea every day, this could be reused (treated waste water option) and that would be a sustainable strategy Southern Water would agree that this is a good strategy but was a low priority. However, financially this is the best of all options and capacity could be developed as needed. There was an energy cost in recycling water but much of this is already needed to pump it out to sea."

CPRE

- De-salination of sea water

Southern Water stated that they had considered many options for potential supply options including desalination. However, desalination also produces a saline waste which, when returned to sea, can cause damage to the marine environment.

(Extract from 'A Water Resource Strategy for Kent') "For much of the county, winter rainfall has frequently failed to support the rates of pumping required to replenish the larger off-stream reservoirs – this must raise doubts as to the viability of the proposed Bewl Water and Broad Oak schemes. It would seem to follow from this that any strategy developed for the county should have a much greater emphasis than hitherto on making better use, and re-use, of existing supplies. Should these fail to meet demand growth, the best recourse may then be to transfer raw water from neighbouring – or even distant – regions."

CPRE

Although Southern Water stated that they have considered other options for supply of water in the future, they did not give any details of contingency plans if any of the projects listed fail to come forward on time.

Water and Habitats Directives from the European Union

This directive aims to protect habitats of our flora and fauna. The Chairman of the Consumer Council for Water (Southern Region) reports that the Environment Agency interprets part of the directive to mean that if an abstraction cannot be shown not to be damaging a habitat, it is assumed to be doing so and must be curtailed. As a result of this, it is assumed that water companies will be asked to reduce their abstractions from groundwater and rivers by 10%. This will happen at a time when we desperately need more water for human needs and the prospect is that we will have significantly less.

The EA's 'underground, under threat' study states: "our assessment of the Water Framework Directive stated that over a quarter of groundwater bodies in England are at risk of failing environmental objectives because of abstraction pressures."

Leakage rates

Southern Water has increased the size of their leakage detection teams which has helped to save an additional 5 Ml/d of water each day in 2006 than in 2005. The leakage rates in Medway were already below the limit set by OFWAT and therefore this is not an issue to be followed further, except to encourage Southern Water to continue with this good work.

The company has written to OFWAT about the renewal of the infrastructure, as they wish to increase the length of the pipework, rather than continuing to patch-up the old pipes.

Housing figures

The plan for the regeneration of Medway, including its waterfront developments, is a 20 year strategy that seeks to bring thousands of new homes to the area. One of the questions must be that if we are running out of water now, how can we provide it for even more homes and businesses?

Medway's water supply is tied into the water resources of the south east as a whole and up to 29,000 new homes per year are currently planned for the region until 2026.

"We know that if you leave the supply resources as they are at the moment, relative to the demand growth associated with 28,900 new houses, (SEERA's H1 housing policy growth figure of 28,900 houses being built per annum across the region) we would have serious problems and deficits in the supply/demand balance, so we cannot have that sort of housing growth without doing something."

Environment Agency

"In their existing demand forecast, we feel they (Southern Water) have underestimated the new homes growth in the Medway area and we would be looking for them to re-balance the number of homes in their demand forecast ..."

Environment Agency

Efficiency savings

Household metering

"We think it is important that extensive levels of household metering are reached with regard to saving water and the extra flexibility it provides in terms of managing the supply/demand balance. We are stressing the importance of new homes being built with water efficient fittings and importance of achieving water efficiency in the existing housing stock."

Environment Agency

Southern Water is only able to install a water metre at present

- when a customer opts to have one installed
- when an occupier moves house
- if an area qualifies for 'scarcity status' then metres can be compulsorily fitted.

Regulatory

The Department for Communities and Local Government (DCLG) produced consultation documents for 'Water Efficiency in New Buildings' which finished in March 2007. This suggested that there could be a new part to the Building Regulations to deal with the specifics of water efficiency through the use of water saving fittings. The 'Code for Sustainable Homes – A step-change in sustainable home building practice' looked more widely at many issues including zero carbon buildings but included water efficiency. However, neither of these consultations has produced a final outcome and cannot be considered in this review.

Green Charter

The Council has adopted a Green Charter for the Rochester Riverside development with minimum requirements in excess of 10% of efficiency savings for all development within this scheme, including water efficiency. Council officers advised that there is no reason why this could not be rolled out to other large sites. Officers can also achieve a certain amount through persuasion and advocate the Green Charter in all developments.

Savings on Tap project

The Committee visited a development in Ashford called Highland Park. This site has been specifically chosen for a water efficiency project by Mid Kent Water in association with Hillreed Homes and Kent County Council.

Half of the properties built retained 'normal' fixtures and fittings and would be metered at Mid Kent Water's standard tariff rates. The other half of the development contained specially selected, water efficient products such as toilets, showers, flow regulators on taps, washing machines and dishwashers. Mid Kent Water would be charging a greatly reduced tariff for water during winter and a higher than normal tariff during summer.

The project is still on-going but householders in the development have completed a survey which appears to confirm that the project has got off to a positive start, with a good level of support from customers.

Water used during construction

During the evidence sessions, it became apparent that there is no specific control over the amount of water used during construction of housing and 20% of brand new materials are discarded or wasted. The Committee was told that the construction bodies are trying to set a higher standard of practice and Southern Water can give guidance to developers.

Although data is not routinely collected relating to the volume of water used on a housing development, Southern Water suggest that the available information indicates that about 50 cubic metres are required per property and this is equal to the volume used by the average metered customer in one year.

Swimming pools, urinals and toilets in Council-owned buildings

Council officers gave evidence which included:

- the Council spent £770,000 on water rates, fresh water and sewerage charges, equating to 530 million litres of water
- European funding of £2,180 had been spent on 'hippobag' devices for toilet cisterns which had generated £3,500 reduction in water charges. This needs to be continued across the Council as a whole to generate substantial savings
- the Council has a "spend to save" fund, which is set up using £150,000 of grant funding from the Carbon Trust and matched with another £150,000 to create a £300,000 fund for corporate energy efficiency works
- officers will submit an application for further European funding under a new Interreg 4A funding stream in early 2008, which will include water efficiency measures

- new urinal sensors are required so instead of flushing every 20 minutes, whether they are being used or not, they would only flush every two hours and every time they are used. There is also a new type of waterless urinal which may merit a trial
- dual flush and low flush toilets should be installed in all new Council buildings and in existing buildings whenever they need replacing
- replacement of taps would also help with reducing water consumption and efficiencies in Council buildings, which includes schools
- heated swimming pools require overnight covers, as they remain heated overnight and there is a lot of evaporation because of this with the resultant need for air conditioning. Some European funding has been secured but a few more pools require covers. This also reduces costs because less chemicals are required to treat the water
- there was also scope for metering swimming pools
- work has already been carried out on public awareness schemes but most of these have been about energy efficiency. The sale of water butts to the public has gone well as they have been available at a reduced price
- the Council was planning a huge amount of work on awareness of climate change in general, together with local partner organisations, to raise awareness amongst employers

Supply of water efficient products

Assumptions by the Environment Agency are being made that between 8 and 21% efficiency improvements will be made in all new developments but the measures to achieve this are unclear.

Evidence from Hillreed from the Savings on Tap project is that highly efficient water-saving 'white goods' products are very hard to find and many of the devices in their scheme had to be sourced from abroad. Most people have never heard of devices such as flow regulators which can be fitted to taps (at a cost of around £4-5 per tap) and result in a large amount of water being saved (over 50%). Many DIY businesses are promoting water saving devices but these seem currently restricted to water butts, drought-tolerant plants and dual flush toilets rather than expanding into further daily-used products.

There is currently no system to measure a piece of equipment or device for water efficiency, similar to the energy efficiency scheme which rates white goods as A, B, C etc. so that the public can make an informed decision on the product before buying it. If a home has a water meter, it is in the homeowners interest to buy a washing machine, dishwasher, toilet, shower or tap which uses a minimal amount of water.

Resilience/contingency plans

Maintaining supplies in Medway is largely dependent on resource developments elsewhere.

The Environment Agency stated that they are encouraging water companies (including Southern Water) to review all the available options and a mixture of options may be the best solution. The EA has not concluded that it has to be a reservoir based solution or that a reservoir based solution is best or that both the Bewl Water enlargement and Broad Oak reservoirs are the right way forward. Other supply options include effluent reuse, desalination or transfers within the South East. The solution is still subject to water company options appraisals, water company water resource plan submissions and EA and others opinions of water resource plans.

As concern builds over the future provision of water to meet current needs and those of householders moving into the thousands of houses planned to be built every year in the South East, the Government held a consultation on water metering in areas of serious water stress because of the water savings it will deliver.

The water savings made from metering are around 10% for a typical household. In areas supplied by Southern Water, 33% of houses have water meters. In Medway the average is at 28%. Southern Water stated it would take at least 10 years to fit between 90-95% of all housing with water metres within Medway.

Of course, metering is not a solution in itself, and in areas where water is in short supply companies need to use the full range of measures including tackling leakages, encouraging water efficiency and bringing on new supplies.

Implications for future growth in Medway

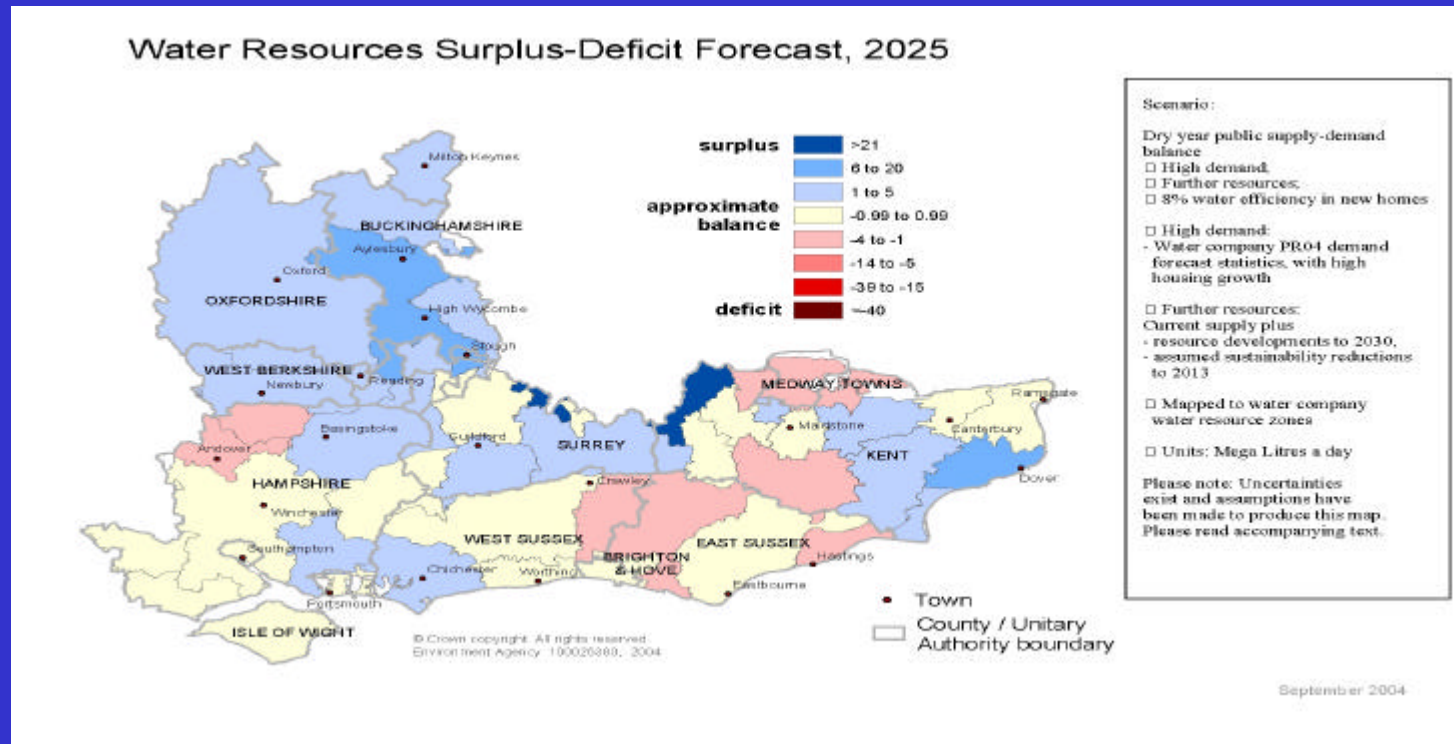
If the enlargement of Bewl Water reservoir does not go ahead by 2015, there will probably be a shortfall in the supply/demand balance in Medway. With groundwater supplies diminishing and no contingency plans on show to provide alternative large scale new water resources other than reservoirs, the fragility of the water resource plan for Medway is evident.

The variations to our weather pattern due to climate change, the type of forecasting factored into the current water resource plans, whether development happens (both in housing and industry) as currently predicted and if efficiency savings of between 8-21% in water consumption are achieved are all unknown factors.

Medway's current and future water supply is sensitively balanced between being in deficit and excess, even though Southern Water has planned for 5% leeway. The extra new concern is the implementation of the European Water and Habitat Directives and how these will affect the proposed enlargement of Bewl Water reservoir and the creation of a reservoir at Broad Oak, as well as the current flow rates in the rivers Medway and Stour.

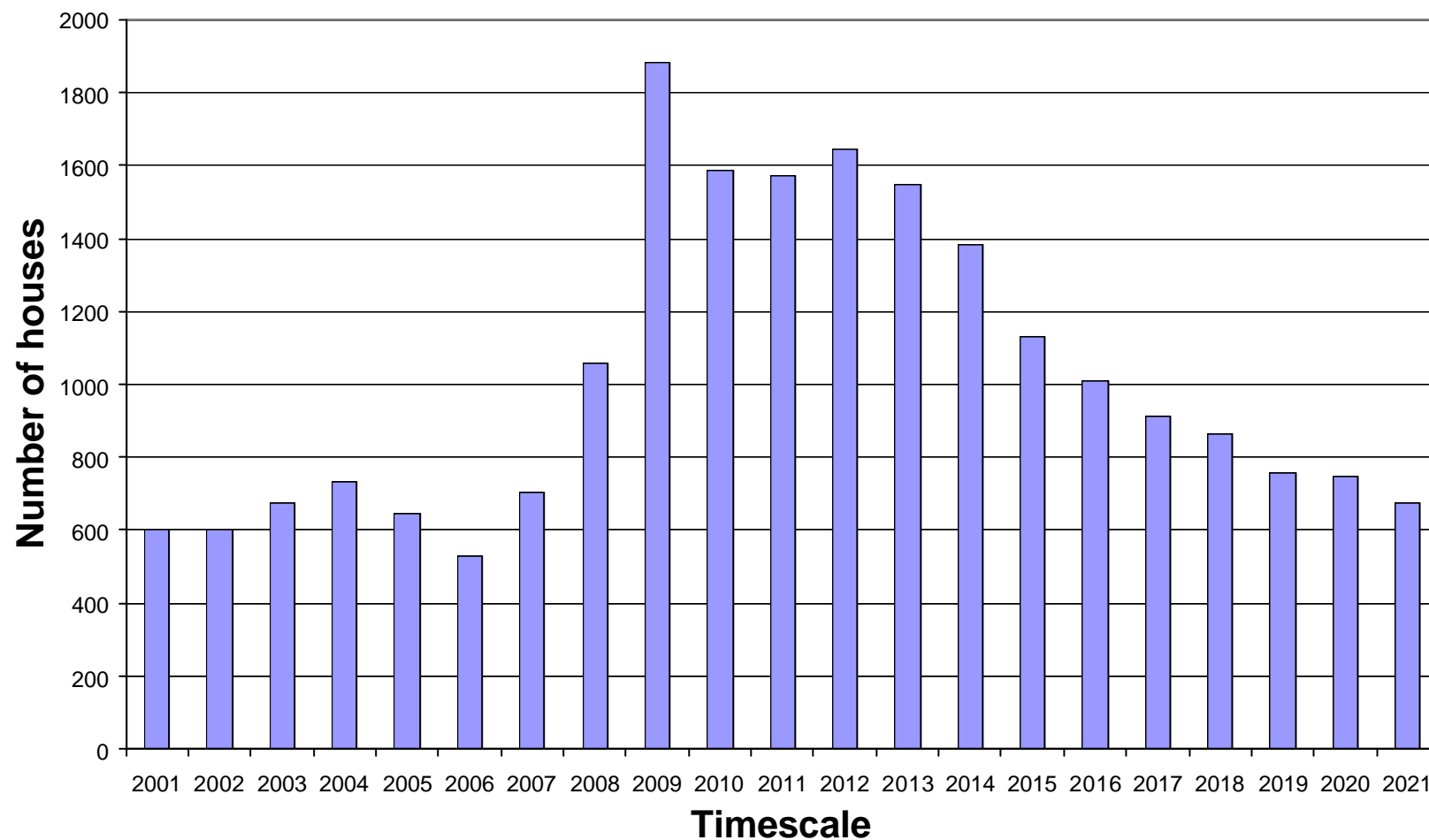
All of these factors will influence the supply of water to Medway and therefore, all future development must take careful account of the current water resource situation and the Council may have to act according to the very latest situation when deciding on future plans.

SEERA's Assessment



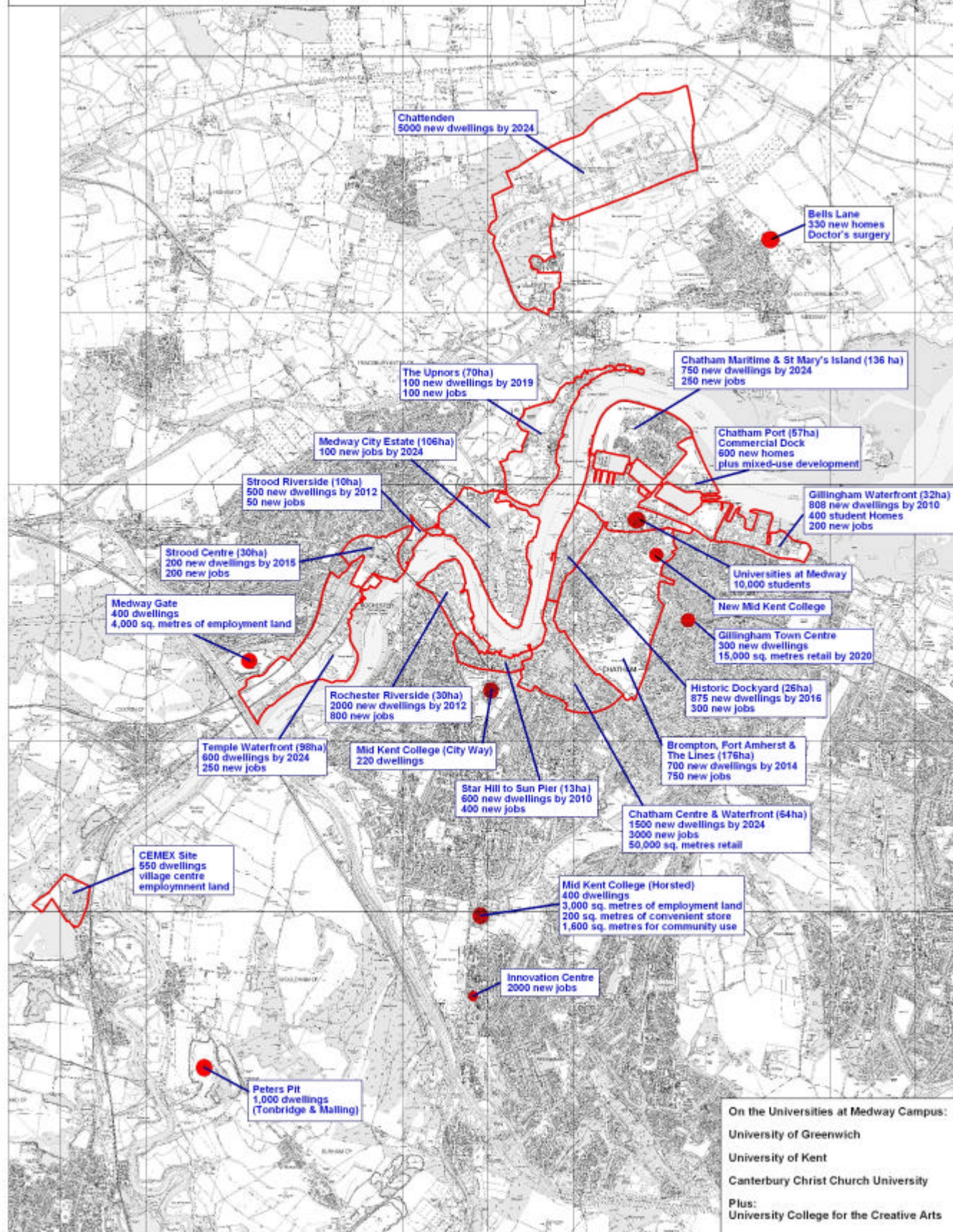
² South East Plan Technical Note 4 (Updated), Water and Growth in the South East March 2006

MEDWAY HOUSING AND MIXED USE TRAJECTORY 2006 - 2021



³ This graph can be viewed in Medway Development Plan Document Submission Stage August 2006, available at:
www.medway.gov.uk/submission-housing_mixeduse_dpd_august2006_cds-version.pdf

Proposed Developments in Medway



The indication of a site on this map does not imply that it has, or will be given, planning permission.

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Medway
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Provision of water for Medway's future needs

FINDINGS OF THE REVIEW

Key findings

- At present there is insufficient co-operation between the water companies to allow strategic planning to be undertaken at a regional level. There is a strong case for a South East strategy for the supply of water and the creation of a statutory body with authority and resources to form such a strategy and direct the water companies in its implementation
- Appropriate supplies can be maintained but only if all the measures currently in the water company's plans come forward and are on time
- When Southern Water attended the hearing, although they were briefly mentioned, no clear details were given of contingency plans if any of the projects listed fail to come forward, particularly those that could supply the same amounts of water in the necessary timescale to match the areas expected growth
- There are no further reserves of groundwater to be exploited within Medway or the surrounding area and therefore local supplies must be supplemented from further afield to meet future needs (70% of Medway's water is from groundwater supplies)
- Medway's current and future water supply is sensitively balanced between being in deficit and excess, even though Southern Water has planned for 5% (this had said "the margin for error in the Medway area is currently between 0 and 5%")
- Southern Water's current Resource Plan under-estimates the amount of development proposed in Medway
- There is considerable uncertainty over whether river flows in the rivers Medway and Stour will be sufficient to yield the planned capacity sought for the expansion of Bewl Water reservoir near Tunbridge Wells and the plans for a reservoir at Broad Oak, near Canterbury while complying with the new EU Water Framework
- The Environment Agency and SEERA are making assumptions that between 8 and 21% efficiency improvements will be made in all new developments but the measures to achieve this (particularly above 10%) are not clear
- Maintaining supplies in Medway is largely dependant on resource developments elsewhere
- The science of climate change is evolving and although climate change scenarios are factored into water resource plans it continues to cause uncertainty. This may influence whether there will be the winter 'spare flow capacity' that is anticipated.

Strategic findings for the primary water supply

The Committee was unconvinced that the supply of water to Medway with regards to the proposed reservoir in Abingdon, Oxfordshire (in Thames Water region) would be feasible. This was because although the Environment Agency and the Campaign to Protect Rural England (CPRE) both advocated the short-term potential benefit for Kent of transferring additional water through London to water-scarce areas before other future planned resources come on track, Southern Water stated that there was no additional surplus available for use in Kent and were not considering this as a possible option.

Abingdon reservoir (which has yet to be built) supplying a short-term solution for East Kent has not been factored into the current South East of England Regional Assembly (SEERA) plans and is a real departure from previous consideration for water supply across the South East by the water authorities. As Medway and other areas in East Kent have a greater reliance on groundwater supplies (which will be dwindling in the future in an already water-scarce region), and if climate change becomes more extreme, this is a significant source of water supply for Medway until other planned resources come on track.

One possibility for increasing the supply of water in water-scarce areas is to re-use treated waste (effluent) water. There was no evidence that Southern Water is proposing to seriously consider this option in their water resource plans. Since the evidence session was held, Southern Water have stated that they discharge approximately 1400 MI/d of effluent per day, 331 MI/d of this is discharged into the sea, the remaining effluent is discharged into estuarine and river waters. The reason for this is that they judge the investment cost required to bring this back into the public supply as too high and that it would also have an adverse effect on the carbon footprint of the company's processes to ensure supply. The Environment Agency (EA) informed the Committee that they were requesting water companies to include this as an option in future water resource planning.

Again, re-use of treated waste water has not been factored into the current SEERA plans and is a real departure from previous consideration for water supply across the South East.

Considering the two points raised above, the Committee considers that there is a strong case for a South-East strategy for the supply of water and the creation of a statutory body with authority and resources to form such a strategy and direct the water companies in its implementation. (This is also a conclusion raised by CPRE.)

The Committee found that although Southern Water had brought more supply sources on-line (Windmill Hill and Lower Bush at 8 million litres a day) these created only a small supply and there was no further groundwater available to develop over existing licence limits and that groundwater supplies would diminish over the next 20 years. **Southern Water may have other contingency plans but these apparently have not been developed to any significant degree. Therefore there is a lack of confidence that they could make up for significant scales of lost capacity. A more explicit examination of alternative scenarios in the company's next water supply plan is still considered essential.**

The Committee heard that CPRE had major doubts that the rivers Medway and Stour would be able to supply the proposed plans at Bewl and Broad Oak as the river flow rates were decreasing and Southern Water supplied details of the river Medway flow rate at below average for the majority of 2005-2006. The EU Water Directive will be a new significant factor for water companies to deal with and exposes the fragility of their water resource plan as it currently has an unknown effect on the amount of water that may be abstracted in the future.

Southern Water rely on historic data with regard to climate change scenarios and although they currently have 5% headroom built into their predictions for the demand of water, **if there is any delay to, or non-delivery of their future plans (as above) or there are more droughts and consecutive dry winters and climate change continues to accelerate there would not be enough water to meet the demand in Medway, taking into account new housing being built over the next 19 years.**

The Committee was at worst unconvinced, at best cautious, as to Southern Water's resource planning until 2020 and beyond. The South East Plan housing figures are as yet uncertain as are the drought scenarios into the future. **2014 appears to be a critical time in particular. Without sufficient water to raise the level of Bewl Water and/or the implementation of a reservoir at Broad Oak there would have to be a break on development in the Medway area of the Thames Gateway.**

The EA stated that they felt that Southern Water had under-estimated the new homes growth in the Medway area and would be looking for them to re-balance the number of homes in their demand forecast which would then reflect on the per capita consumption balance across their customer base.

If Southern Water actioned this and it was found that the resource plans had under-estimated the number of new developments, the Committee was concerned as to where the additional supply would come from?

The Committee had concerns that Southern Water, developers and other interested organisations would not achieve the upper end of the 8-21% efficiency savings as factored into the water studies as part of the South East Plan. Currently there seems to be a focus on education and awareness initiatives that may achieve greater consumer awareness over the long term but not necessarily greater efficiency for the immediate future and no specific ideas were put forward to achieve 21% efficiency savings, except for campaigns and advertisements to consumers.

The Committee therefore supported an initiative to achieve compulsory water metering in areas of serious water stress, as Medway is close to becoming such an area, as a method of including existing houses in water efficiency savings. The Committee also wished to write to SEERA and Defra with regard to the 8-21% efficiency target, stating that there had been no evidence that 21% could be achieved and that perhaps this is an unrealistic target.

Medway Council currently has a Green Charter for the Rochester Riverside development and the Committee advised that it was very important for the Council to expand this charter to cover all future development within Medway with the aim to include the minimum requirements expected in a Development Plan Document as soon as practicable.

The Committee considered that the Council's role with regard to water is as follows:

- **to reinforce messages with regard to water efficiency and maximise its own efficiency**
- **to use the planning function and the local development framework to maximise opportunities for sustainable water use in new developments**
- **to do as much as possible to reduce climate change**
- **to facilitate, promote and encourage, with partner organisations, alternative water saving schemes**

Provision of water for Medway's future needs

RECOMMENDATIONS

The Committee recommends the Cabinet/Council to make strong written representations as follows:

SEERA

South East Plan public examination (actioned in January 2007)

1. A letter was sent to the South East Plan public examination highlighting that Southern Water's plans for water supply in Medway would appear to be inadequate, taking into account the new housing that is proposed by 2026 and the lack of contingency planning should the raising of Bewl Water reservoir and the implementation of a new reservoir at Broad Oak either be delayed or not delivered.

"In view of this, the application and enforceability of Policy CC5 "*Infrastructure and Implementation*" in the South East Plan will be of considerable importance given the uncertainty over the future supply situation in Medway."

(The above inclusion in the letter on behalf of the Committee to the South East Plan public examination means:

If the scenarios set out previously in this review were to happen, Medway Council may use this policy as a ground for refusing planning permission to housing development(s) in the event that the raising of Bewl Water reservoir and/or the implementation of a reservoir at Broad Oak were to be delayed and/or unavailable in the future in the interests of public health and safety.)

Other

Letter to the South East of England Regional Assembly with regard to:

2. Water companies will be reassessing the target headroom allowances as part of considering future risks and uncertainties in preparing their new water resource plans. The Council recommends that the companies, Regulators and Government ensure adequate and justifiable headroom allowances (approximately 10-12%) are included in the plans.
(Same recommendation to OFWAT/Defra/Southern Water)
3. Evidence was given to the review about the 8-21% efficiency savings that should be achieved in the forthcoming years but it was not proven that the upper end of this target is practicable or achievable and the Committee request that SEERA, Defra and OFWAT re-consider this target and re-assess the impact this may have on water resource planning.
(Same recommendation to Defra and OFWAT)

Southern Water

Written representations to Southern Water to:

1. request that further consideration and research is undertaken on the re-use of treated waste water and that Southern Water considers a request to work with the University of Greenwich and Medway Council on a trial on the re-use of treated waste water back into the mainstream supply (see paragraph for University of Greenwich below).
2. recommend that Southern Water, together with Regulators and Government, ensure adequate and justifiable headroom allowances (approximately 10-12%) are included when reassessing the target headroom allowances as part of considering future risks and uncertainties in preparing the new water resource plans.
(Same recommendation to OFWAT/Defra/SEERA)
3. ask if the current water resource plan has under-estimated the number of new developments due to be built in Medway (as indicated by the EA) and, if this is the case, where the additional water supply will be found to meet the needs of Medway
4. voice the Committee's concern that the raising of Bewl Water reservoir and the implementation of a reservoir at Broad Oak may not happen, especially as river flow rates are below average and decreasing and the EU Directives mean that less water is able to be abstracted than at present and that no contingency plans were forthcoming.
5. request that Medway Council is made a statutory consultee for the next water resource plans.
6. formally propose a service level agreement with Medway Council for the use of the warden service to monitor illegal use of hydrants and hosepipes.
7. offer, as part of the possible service level agreement, to advise Southern Water, in future, at the point when the Council is notified of a change of use to housing multiple occupation so that they can pursue their statutory powers with regard to water metering.

University of Greenwich

Letter to University of Greenwich requesting:

1. that serious consideration and research is undertaken, in consultation with Southern Water and Medway Council as a Medway project, to the re-use of treated waste water back into the mainstream supply, as there is already a cost of treating and pumping it out to sea.
2. to consider using as a research topic, a re-use for the discharged water from swimming pools.

OFWAT and Defra

Letter to OFWAT and Department for Environment, Food and Rural Affairs asking:

1. that serious consideration is given to the creation of a statutory body with authority and resources to form a South East water strategy and direct the water companies in its implementation to ensure an adequate supply and water transfers as and when necessary across the region.

The Council's justification for this request is its concern of Southern Water's resource planning which has too great dependence on the raising of Bewl Water reservoir and/or the implementation of a reservoir at Broad Oak and no other contingency plans now available should these fail. There is also too little headroom predicted between supply and demand to allow for increasing drought scenarios, even with any of the increased resources becoming available.

2. Water companies will be reassessing their target headroom allowances as part of considering future risks and uncertainties in preparing their new water resource plans. The Council recommends that the companies, Regulators and Government ensure adequate and justifiable headroom allowances are included in the plans.
(same recommendation to SEERA and Southern Water)
3. The letter to also include a request that serious consideration is given to enforcing a scheme of rating white goods for water efficiency similar to that currently used for energy rating and car emissions to allow the public to be able to make an informed choice.
4. Evidence was given to the review about the 8-21% efficiency savings that should be achieved in the forthcoming years but it was not proven that the upper end of this target is practicable or achievable and the Committee request that Defra, OFWAT and SEERA re-consider this target and re-assess the impact this may have on water resource planning.
(Same recommendation to SEERA).

Homebuilder's Federation

1. That a letter is sent to the Homebuilder's Federation expressing concern at the amount of water and materials used and wasted during construction. The letter should request that the federation seeks guidance from the Environment Agency and water companies in order to achieve better, more water-efficient working practices.

Suppliers

1. Write to major suppliers (wholesalers and manufacturers) to request that they consider stocking, producing and promoting water efficiency goods such as flow regulators for taps, aerated shower heads, low-flush dual-flush toilets, hippo-bags (water displacement in toilet cisterns), etc.

What the Council can do

The Director of Regeneration and Development is asked to:

1. have regard for Policy CC5 '*Infrastructure and Implementation*' in the South East Plan, as a material consideration when determining planning applications for major developments, including housing, in the event that the raising of Bewl Water reservoir and/or the implementation of a reservoir at Broad Oak were to be delayed and/or unavailable in the future, in the interests of public health and safety.
2. develop the Rochester Riverside Green Charter to become the 'Medway Council Green Charter' - a statement of intent for all future new build within Medway and eventually to become part of a Development Plan Document so as to ensure that such issues can be considered as part of the policy context when determining planning applications. This should be updated as frequently as possible to keep abreast of latest technologies and efficiencies to ensure greatest savings are achieved as possible. Southern Water has also shown an interest in being consulted on the Green Charter and the Committee asked that officers consider consulting them in the future.
3. develop the 'Medway Council Green Charter' to include rainwater harvesting and water butts plus underground tanks for watering public areas of green space.
4. produce a Sustainability Guide for planners and developers which could be developed as a Supplementary Planning Document and become part of the Development Plan for the area. It would then be a material consideration in the determination of planning applications and part of the evidence at planning appeals. Such a document has significant weight and is for the Council's determination of planning applications, a statutory responsibility of the Council and for the guidance of the community, including developers.
5. investigate making the grant of planning consent conditional on the installation of specified water-saving fittings including as a minimum dual-flush toilets, aerated showers, low-flow taps and where feasible rainwater capture facilities with a view to doing so if such conditions are considered to be legally enforceable. Also, whether it would be possible to enforce the fitting of water meters where there is a large conversion and/or extension involving bathrooms and kitchens.
6. request Development Control officers to include a planning informative in all permission granted for new housing developments, to contact Southern Water for advice on efficient water use during development.
7. investigate the possibility of Development Control officers requesting an environmental sustainability assessment, including water, on all major developments.
8. produce a sustainability survey, including water, which should be a condition of the sale of all Council owned land, where appropriate.

9. investigate the possibility of a new ecological footprinting policy for all property conversions. This should include a method to assess the impact of the conversion (additional water products to be used) so that, if necessary, the current water devices in the property are also brought up to date in terms of water efficiency to achieve 8-21% efficiency savings.
10. develop a guidance leaflet for distribution with planning applications forms with regard to water efficiency devices and methods and water meters.
11. investigate the possibility of establishing a possible service level agreement with Southern Water as follows:
 - water enforcement with hydrants and hosepipes using the Council's community street teams to report any irregular use of water
 - to advise Southern Water, in future, at the point when the Council is notified of a change of use to housing multiple occupation so that Southern Water can pursue their statutory powers with regard to water metering
12. act as intermediary to negotiate the possibility of water efficiency trials for re-use of waste water between the University of Greenwich, Southern Water and any other appropriate partners.

Assistant Director, Communications and Improvement is asked to:

13. investigate the possibility of sourcing a supplier of waterless urinals with a view to carrying out a trial (and, if found to be suitable, eventually replacing all relevant Council stock as and when necessary.)
14. investigate the benefits of water metering the Council's swimming pools. (Cost to be identified.)
15. continue to seek further funding for water efficient and water saving products to be installed in any Council building as and when practicable.
16. promote water efficiency in Medway, for example Medway Matters, schools, libraries, etc. and to include water efficiency in the Council's work on public awareness on climate change. (Cost to be identified.)

The Chief Executive is asked to:

17. seek to ensure that the proposed new Civic Headquarters is the flagship for water efficiency initiatives with as many water-efficient and water saving devices to be installed as practicable.

Other

18. The Committee requests that officers action the following recommendations as soon as possible and provide a response to recommendations 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16 and 17 for the Committee meeting to be held on 6 February 2008.

Provision of water for Medway's future needs

REFERENCE SOURCES

The following documents were used in production of the review report:

- Maidstone Borough Council report on Climate Change
- Kent County Council Select Committee report "Water and Wastewater, particularly in Ashford" September 2005
- Kent and Medway Structure Plan Adopted 2006
- Draft South East Plan Submission Document 2006
- Ofwat's consultation "Contributing to sustainable development" – April 2006
- Waterwise response to the Government's proposals for a Code for Sustainable Homes
- Evidence from the Select Committee on Science and Technology –Water Management Volume 1 – June 2006
- Campaign for the Protection of Rural England (Kent) 'A Water Resource Strategy for Kent' by Graham Warren – June 2006
- Consumer Council for Water (Southern Region), 'Kent's Water Supply: Water, water everywhere, nor any drop to drink' - September 2006
- Friends of the Earth press release – Government report on water conservation – 21 August 1995
- Kent Messenger – Drought special – 1 September 2006
- Daily Mail – Drought report – 18 May 2006
- Letter to Judith Armit – chief executive – from Southern Water – 17 March 2006 re application for a drought order
- Extract from Daily Telegraph – "hosepipe bans" dated 4 April 2006
- Extract from Daily Telegraph – "2.4m face toughest water curb in years" dated 21 March 2006
- Extract from Daily Mail – 15 March 2006
- Supplement on water from Hydro International – from The Times – 19 July 2006
- Southern Water - Planning for a Sustainable future – 2005/2006
- EU Water Framework Directive – 2000
- The Department of the Environment, Heritage and Local Government website – water services
- South East plan
- Guardian Unlimited article 'New water warnings for south-east England'
- Royal Town Planning Institute – press notice - 'RTPI calls for urgent plan to avert south east water crisis' – 6 June 2006
- Underground under threat – the state of ground water in England and Wales – Environment Agency
- Environment Agency Maintaining water supply (the EA's advice to Ministers on the final water resource plans submitted by water companies as part of the 2004 periodic review) July 2004
- Do we need large-scale water transfers for South East England – 2006? – Environment Agency – September 2006
- Department for Communities and Local Government – Water Efficiency in New Buildings – a consultation document – December 2006
- Department for Communities and Local Government – Code for Sustainable Homes – a step change in sustainable home building practice – December 2006
- Southern Water Draft Drought Plan for Consultation – March 2006
- Water Framework Directive Thames River Basin District Summary report of the characterisation, impacts, economics analysis and support maps required by Article 5 March 2005