

Thames 21 - A Planning Perspective and a Sustainable Strategy for the Thames Region

SEPTEMBER 1995



NRA

*National Rivers Authority
Thames Region*

“ In the past, ‘improving’ rivers often meant increasing their flow capacity. In future it should refer to multi-purpose schemes designed to improve the capacity of each river valley to function as a visual amenity, a recreation area, a fishery, a nature reserve, a water supply, a storm-detention area, a drainage network, and a movement corridor for boats, walkers, cyclists and equestrians.”

'Landscape Planning' Tom Turner - ULC Press Ltd 1987

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Cover picture: Nocturne in Blue & Silver; Cremorne Lights
 J.A.M. Whistler (Copyright: The Tate Gallery, London)

Foreword

Following the excellent response to our consultation document I am delighted to introduce 'Thames 21' in its final form. A typical comment was 'Thames 21 confirms our view that the initiatives of the NRA are now gathering momentum and that the organisation is emerging as one having considerable influence on planning issues' [The Chiltern Society].

Clearly our approach to sustainable development is widely shared. There are obvious benefits in achieving a consensus with all those with a stake in the future of the water environment. This augers well for successful partnerships in addressing the major development issues across the Thames Region.

The main criticisms of the consultation draft were that it did not adequately address the issue of sustainability, it did not explain its context in relation to AGENDA 21 and that its relationship with Catchment Management Plans was not clear. These criticisms have been addressed in this final version. There were also a number of helpful points of detail relating to development issues and the application of NRA policies. We trust that readers will find that these matters have been attended to.

The new Environment Agency, which takes over from the NRA in April 1996, offers the opportunity for more coherent and integrated environmental protection and enhancement. Its aim will be to help promote sustainable development through high quality, integrated environmental conservation, enhancement and rehabilitation. Thames 21 is a major step towards achieving this early in the life of the Agency.

This document will therefore provide the foundation for business planning for the new Agency in the Thames Region for many years to come. It will also promote the water environment through the land use planning system.

Should you have any further comments on Thames 21 then I should be glad if you would send them before 30th November 1995 to:

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On all other water related planning matters please consult your NRA local area office in the normal way. Details of these contact points are set out at the front of the document.

A handwritten signature in blue ink, appearing to read 'Les Jones'.

LES JONES
Regional General Manager

What you thought of our consultation draft

The Association regards the consultation draft of 'Thames 21' as an extremely helpful step forward towards the integration of land use planning and water resource planning together with other issues affecting both.

(Town and Country Planning Association)

The report makes scant reference to the need to set the NRA's work for the 21st Century in the context of sustainable development and biodiversity conservation.

(Royal Society for the Protection of Birds)

The thrust of the document could be taken as opposing change and seeking to preserve a status quo or improve it. In practice it will be important to recognise and accommodate the need for change, not all of which can preserve or enhance. We believe some recognition of this within the introduction would show a clear understanding of the complex realities of modern life.

(Thames Water Utilities)

It is a pity that the issue of the meaning of 'sustainability' for the NRA's functions and for the NRA's strategic planning is not addressed explicitly and given fuller consideration.

(Middlesex University)

Does not consider that 'Thames 21' gives adequate consideration to ensuring that the broader environmental costs are given sufficient weight particularly with regard to conservation matters within the floodplain ...

(South Bucks District Council)

I regard this as one of the best summaries of the sobering complexity of issues that now face the planning fraternity.

(Cranfield University)

The Unit warmly welcomes the production of this draft strategy. It represents an excellent initiative which is of vital importance to the work of all planners and environmentalists in the Region.

(London Ecology Unit)

I would like to take the opportunity to welcome the report, which clearly identifies the main issues and policies relating to the NRA's responsibilities. The report will provide a sound basis for dialogue between strategic planning organisations which, as you strongly suggest, should be the way forward.

(London Planning Advisory Committee)

This document recognises the scope of the Town and Country Planning system for providing major opportunities to integrate water and land use issues at both Area and Regional levels. It is encouraging to see the issue of sustainable development being addressed in a practical sense.

(Essex County Council)

1. Introduction

The setting up of the new Environment Agency has been seen by the Secretary of State for the Environment as an important step in taking forward the Government's policies on sustainable development. This means combining economic development with the furtherance of the conservation and enhancement of the environment. It includes natural beauty and the conservation of flora, fauna and geological or physiographical features of special interest. The Agency will take into account the costs that are likely to be incurred, and the benefits that are likely to accrue from the exercise of these powers. Decisions are to be based on the best available scientific information, applying the precautionary principle where necessary, considering the ecological impacts and ensuring that responsibility follows the 'polluter pays' principle.

An important element of sustainable development is achieving environmental goals without imposing unnecessary burdens on industry and the public. The idea of the best practicable environmental option is useful in making decisions. Ministers have issued draft guidance to the Agency on the contribution which they consider it appropriate for the Agency to make towards the objective of achieving sustainable development. Whilst acknowledging that there are limits on what the Agency will be able to achieve on its own, the guidance recognises that it will have a crucial role in operating a regulatory framework. This will help to ensure the sustainability of development which is regulated by the Agency. The Agency is to take an integrated approach to providing effective environmental protection by working closely with local planning authorities. 'Thames 21' articulates a vision of the water environment. It is supported by a strategy to link land use and water related issues through the land use decision making process.

The response to the consultation draft of 'Thames 21' gave overwhelming support for the principle of a planning perspective and for the promotion of a sustainable strategy for the water environment of the Region as a whole. Furthermore consultees have also responded to the debate on the nature of

the land use/water issues. However a significant number felt that the consultation draft should have gone further in applying sustainability principles to future growth of the Region and the locations where it is likely to take place. We have addressed such shortcomings in this final strategy document.

We would like to take this opportunity to thank everyone who has responded for opening up a constructive debate on the practical application of the principles of sustainable development and of environmental capacity. This has enabled us to advance strategies for the major growth locations in the Thames Region in considerable detail. We believe that we have laid the foundation for a partnership approach to channelling economic growth pressures to the greatest environmental advantage and we look forward to a continuing dialogue with all organisations with an interest in the water environment.



The River Thames is a national asset of worldwide renown.

1. Planning Context



20km Approx

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2. Thames 21, Local Agenda 21, Catchment and Land Use Planning

The NRA can implement a wide range of projects by acting on its own. However, working in partnership with other organisations offers increased opportunities for maximising our effectiveness. The statutory town and country planning system offers a powerful route for promoting NRA policies and we have made substantial progress in this direction in recent years. This chapter reviews the progress that has been made to date and sets out a prospect for closer partnerships with business, local planning authorities and local communities in order to enhance the water environment.

'Thames 21' has three roles. First, it acts as a bridge between the NRA and external organisations dealing with strategic planning. In this role it seeks to articulate water related interests in Regional Planning Guidance. Second, it provides an easy-to-use summary of current NRA policies for promotion through the statutory development plan system. And third, it provides a regional context for the preparation of Catchment Management Plans with an indication of the development issues which these plans will need to address. This will enable them to promote sustainable natural resource management.

The Relationship to the Development Plan System

The NRA recognises the advantages of promoting the water environment through the statutory development plan system. 'Thames 21' is an important part in the ongoing dialogue with local authorities in identifying those locations where water related policies need to be most actively pursued.

Participation and partnership between all parties with a stake in the development is seen as an important aspect of this approach. While legislation, land use planning and economic instruments may be the main tools of control,

consensus can be a powerful influence for enabling satisfactory development to take place. This is particularly true both of the NRA's relationship with the development plan system and local authorities' participation in the Catchment Planning process.

The NRA recognises the development plan system as a prime vehicle for delivering sustainable development. 'Thames 21' seeks to establish a widely based agreement for guiding the pressures for development across the Region.

The Relationship between the NRA and the Water Companies

The NRA and the Water Companies fulfil complementary roles in the water industry. The latter are concerned with the supply of water, surface and foul water drainage and the treatment of sewage. The NRA is concerned with the overall policies on water resources, water quality and surface water management, which includes flood defence issues. This is achieved through the licensing of water abstraction, control over discharges and negotiation over granting land drainage consents. The NRA has a duty to conserve and enhance the water environment when carrying out any of its functions, and a further duty to promote conservation and enhancement more widely. Because the former duty is shared with the privatised water utilities, there is potential benefit for all parties in adopting a partnership approach.

The NRA issues licences and consents to the water companies and works closely with them when determining consents and on matters of joint concern. The NRA and the water companies recently agreed a long term programme for investment by the water industry aimed at securing the optimum environmental benefits.

2. Major Development Locations and Catchment Management Plans



The Role of Catchment Management Plans

The NRA has a nationwide programme for the completion of the first round of Catchment Management Plans by the end of 1998.

Catchment Management Plans are the vehicle for the integrated planning of the water environment. They will be able to address pressures for development as a catchment issue. The implications of development can be explored as can the potential for environmental enhancement. The Catchment Management Plan should then identify appropriate thresholds for acceptable limits to growth at the location in question. It may even address the environmental capacity of the area in respect of any particularly critical land use. Such thresholds and capacities will then be recommended to local authorities for inclusion in their development plans. The Regional Planning Guidance for the East Midlands (RPG8) offers useful advice on integrating aspects of Catchment Management Plans into the statutory planning system. This advice could advantageously be followed by planning authorities in the Thames Region. It reads:

'Planning authorities should have regard to Catchment Management Plans when formulating development plan policy. They bring together the management of all water-based interests within individual catchments'.

Progress towards implementing many of the detailed proposals set out in our Catchment Management Plans can only be achieved through a partnership between a number of key agencies and organisations. The funding of such projects is likely to involve a range of sources. In many instances these may not be directly available to the NRA. We may therefore only be able to promote certain projects by establishing partnership arrangements with the appropriate bodies. It is similarly desirable that other bodies should involve the NRA where water related issues arise. The Catchment Management Plan is seen as the ideal vehicle for establishing such linkages.

The idea of environmental capacity is increasingly applied in terms of natural resource management. This is an important instrument for maintaining and enhancing the overall stock of natural assets or 'capital'. The first practical application by the NRA was for the Cotswold Water Park in The Upper Thames Catchment Management Plan.

The environmental capacity of the Cotswold Water Park area was defined in terms of three after-use categories:-

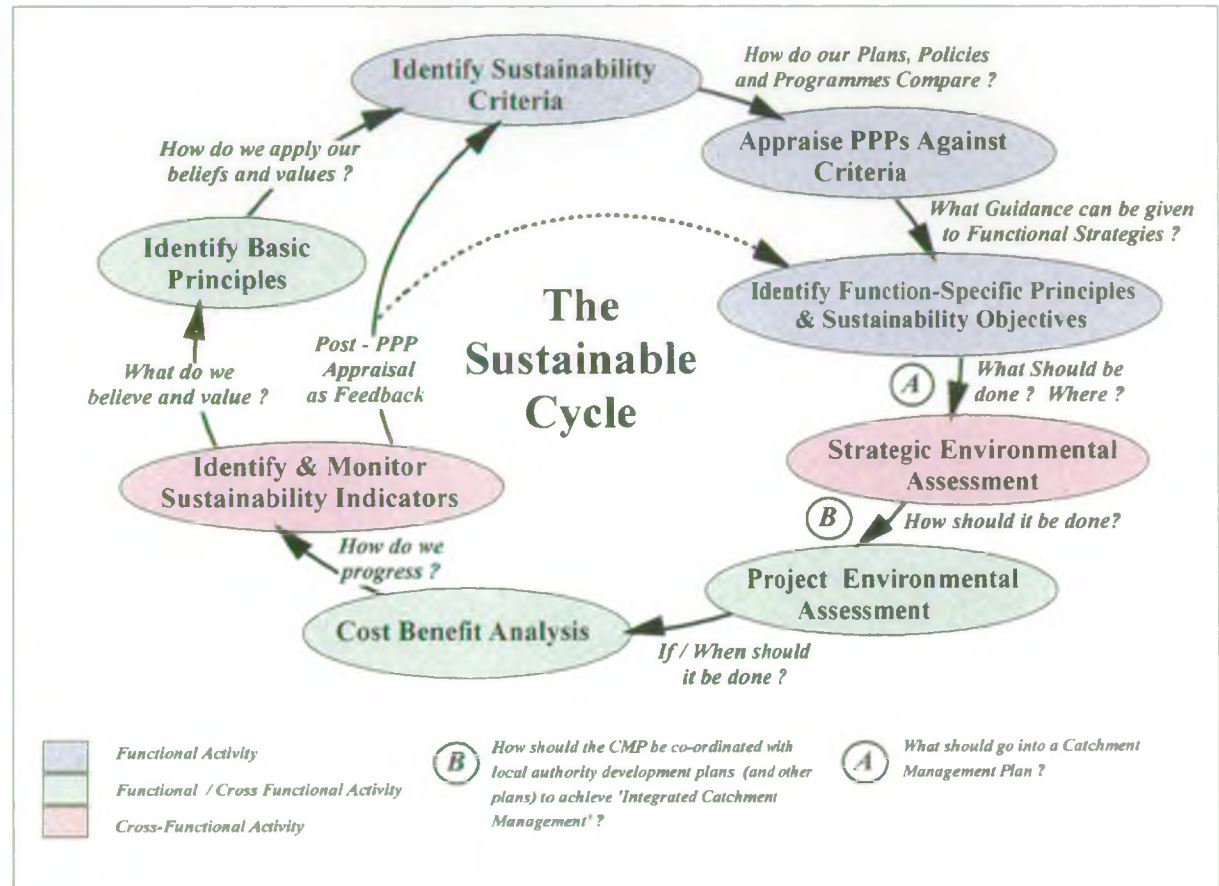
1. Areas within the floodplain where there should be a presumption against mineral extraction for environmental reasons.
2. Areas in the floodplain where mineral extraction would be acceptable if followed by restoration to wetland for nature conservation.
3. Areas outside the floodplain where mineral extraction followed by restoration to agriculture would be acceptable.

In order to ensure a consistency between Catchment Management Plans we are seeking to address issues that are likely to be common to these plans and which present opportunities for action, usually in partnership with other organisations. These include:-

- installing surface water source control
- recycling effluent
- provision of storage ponds
- provision of access to rivers
- water related land use proposals in the development plans of local authorities.



.....pointing to a sustainable future for the water environment.



A Vision for Closer Partnerships

AGENDA 21 gives a high priority to fresh water, reflecting the management crisis facing the world's freshwater resources. By the year 2000 all states should have national action programmes for water management, based on catchments, and efficient water-use programmes. These are expected to include integration of water resources with land-use planning and other development activities, demand management through pricing or regulation, conservation, reuse and recycling of water. Water resources must be planned and managed in an integrated and holistic way to satisfy basic human needs, prevent shortage of water or pollution of water sources, and preserve ecosystems and biodiversity. This has significant implications for our institutional, legislative and political frameworks and the decision making process.

For the NRA AGENDA 21 offers:-

- The opportunity to place greater weight on environmental considerations when assessing planning applications.
- The opportunity to increase community involvement in water issues.
- Help to implement Catchment Management Plans.
- The opportunity for integration of land use and water-related issues, leading to full-scale integrated catchment management planning.
- Additional opportunities to protect the water environment.
- Increased public awareness of the water environment.
- Help to identify appropriate environmental indicators.

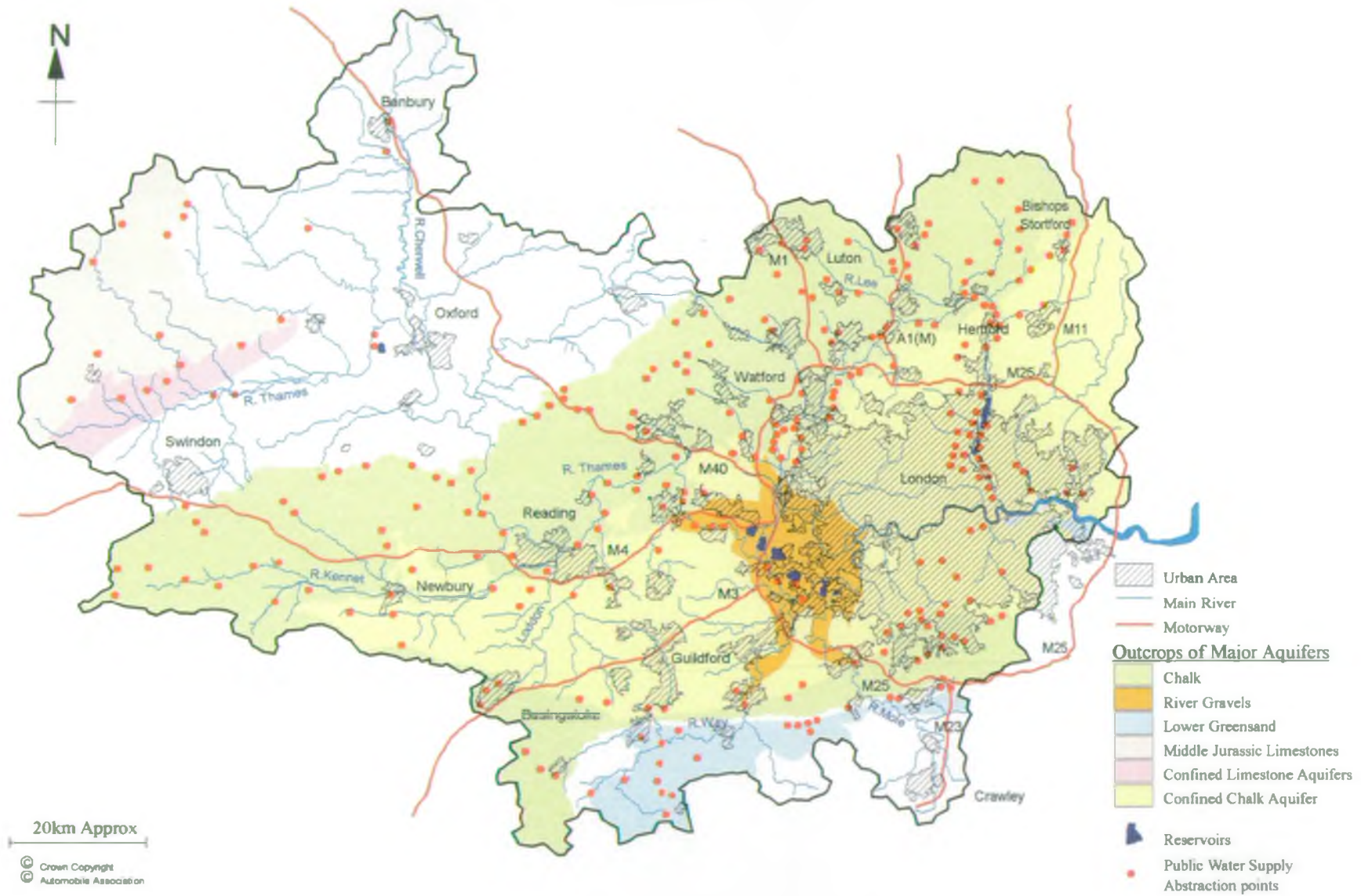
In the long run it should be possible for the NRA to build on these established principles by developing the following techniques referred to in the figure opposite:-

1. The NRA Thames Region believes that appropriate levels and locations of development can only satisfactorily be identified after the environmental characteristics of the Region have been assessed. Strategic environmental assessment which seeks to evaluate alternative locations for development is seen as an important instrument for influencing local planning authorities in making strategic decisions. It needs support from a range of sustainability objectives and principles related to the various functions involved.
2. Such principles and objectives can be derived from a process of appraisal of functional plans, policies and strategies, as in current government guidance on the 'Environmental Appraisal of Development Plans'. This process requires identification of basic sustainability principles and criteria appropriate to the function involved for example:-
 - that the polluter should bear the cost of pollution
 - the precautionary principle should be applied in decision making
 - thresholds of environmental capacities should be respected.

Adoption of this iterative process would provide a co-ordination of catchment management plans and development plans through Strategic Environmental Assessment, and allow the interested parties to develop techniques for seeking consensus over difficult issues.

3. Current work on identifying key environmental indicators as described on page 25 will provide a further means of identifying sustainability criteria. Where suitable objectives can be defined to meet these criteria, they should be considered in the Strategic Environmental Assessment process.

3. The Water Resource



3. Sustainability in the NRA's Functional Responsibilities

STRATEGIC CHOICE FOR NRA FUNCTIONS

The NRA's core functional responsibilities are described on the following pages. Guidance on methods for protecting the water environment through development plans is set out for each core function, together with a number of principles which the NRA adheres to in advancing sustainable development. These objectives are promoted by the NRA through working closely with local planning authorities.

Water Resources

The NRA has recently published 'Water : Nature's Precious Resource', a document which addresses the development of an environmentally sustainable water resources development strategy for England and Wales. A separate document addresses strategic water resources planning issues for the Thames Region and is titled 'Future Water Resources in the Thames Region'. In Thames Region strategies are compared against existing and known planned resources for each water company and are based on a range of scenarios of potential demand for water, (high, medium and low) taking into account:-

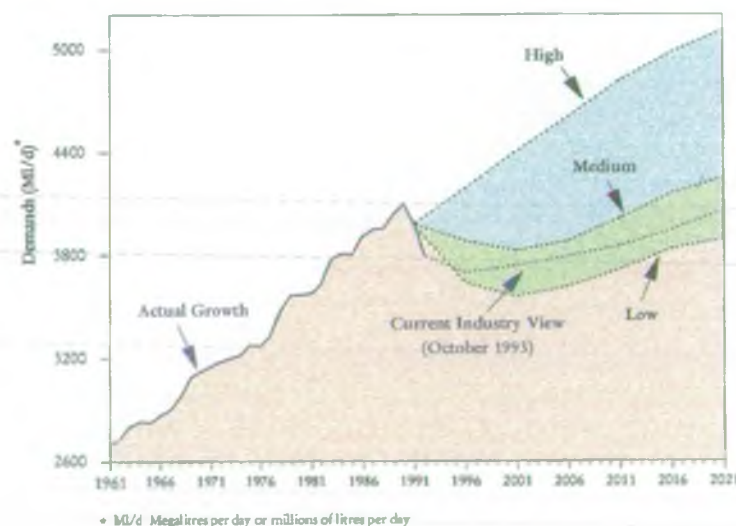
- projections of population growth provided by OPCS
- changes in domestic use
- growth in commercial and industrial demand
- the implications of leakage control and domestic metering.

These scenarios show that with adequate leakage management and the promotion of water efficiency measures, which are essential elements of the regional water resources strategy, there should be sufficient water resources to meet the planned level of growth in most areas across the Region. If we can successfully manage future demands for water it may be possible to delay the need for new strategic water resource schemes and possibly avoid them altogether.

Nevertheless, there remain a number of uncertainties in forecasting demand over the next 20-30 years and, in case growth in demand for water cannot be managed, the NRA have identified a number of possible water resource development options to meet potential water resource shortfalls. These include Thames Water Utilities

Limited's proposed reservoir in South-West Oxfordshire and transfers of water from rivers in other NRA regions. However there remains a great deal of further investigation before preferred strategies for meeting demand can be identified. Areas most at risk in the Thames Region include the Sutton District water supply area, London and the Upper Thames supply areas of Thames Water Utilities Ltd. With the exception of certain peak demands there should be sufficient water resources to meet future demands for water to 2021 for most other areas.

Supply and Demand for Public Water Supply 1961 - 2021



Scenario Assumptions

High	High rates of growth in domestic and non-domestic consumption; no increase in current demand management activity.	Medium	Moderate growth in domestic and non-domestic consumption; limited domestic metering and reduced leakage.	Low	Moderate growth in domestic consumption and no increase in non-domestic consumption; moderate domestic metering and further reduced leakage.
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A number of development options to provide additional resources to the Region are currently being investigated. These include:

South West Oxfordshire Reservoir Proposal. This scheme was originally promoted by Thames Water Utilities Ltd. Based on abstraction from the River Thames at times of high flow and augmentation of the River at times of low flow, the scheme would be used to supply London and the Upper Thames. More recently, Thames Water Utilities Ltd has deferred the proposal, recognising the potential for managing growth through leakage management and a recent downturn in commercial and industrial demand for water.

Severn to Thames Transfer. This involves the transfer of water from the River Severn to the River Thames supported by reservoir storage in Mid-Wales. The scheme involves many complex environmental issues. Development in conjunction with the restoration of the Thames and Severn canal has been ruled out on engineering feasibility and cost grounds but there may be some potential for a smaller scale transfer which could benefit the restoration project.

Anglian to Thames Transfer. Possible reservoir sites in Anglian Region are currently being investigated which could meet the predicted demands for Anglian Region and also make some water available to the Thames Region.

London Basin Groundwater. The confined chalk aquifer of the London Basin provides an extensive natural storage body which has very limited connection with the river system. Sophisticated management of this aquifer, particularly incorporating the technique of artificial recharge, can increase water resource yield without causing undesirable environmental effects. The principle is being investigated in South and Central London after recent success in some locations within Central London. Rising groundwater levels may pose a threat to foundations and tunnels constructed whilst levels were depressed. Rising levels can be controlled by pumping and the excess water used for supply.

Every option will need to be considered against the principal sustainability criteria - environmental, social and economic - in addition to further considerations of engineering feasibility.

Flows in several rivers have been depleted as a result of groundwater abstractions close to rivers. Remedial schemes aimed at the alleviation of low flows on the Rivers Ver, Pang and Letcombe Brook are in place and are already achieving significant results, largely through the reduction of groundwater abstraction to allow base flow recovery. A scheme has been agreed for the River Misbourne, and others are under investigation. However reducing environmental stress in this way in certain locations may result in additional pressures on water resources elsewhere.

Regional Planning Guidance (RPG9) indicates that the rate of development across the Region should take into account the ability of the infrastructure to meet demands for water. However, it also states that the ability of existing infrastructure to meet demands should not be regarded as a long term constraint. Therefore, in liaison with the local planning authorities, the NRA would normally seek to discourage development in locations where water resources are already scarce, or where additional development is likely to result in less reliable supplies for the existing population and industry.

Guidance for Development Plans

Where development would lead to a risk to water resources further allocations of land should normally be resisted until adequate resources can be made available.

Current Sustainability Principles for Water Resources

- i) There should be no long term deterioration of the water environment resulting from water use or water resources for future use.
- ii) Reasonable demands for water from both existing and new social and economic development should be satisfied.
- iii) Priority should be given to the management of water demand, and to ensure the best use is being made of existing resources. Only if additional water resources are still required will new water resource development be considered.
- iv) In managing water resources, opportunities to enhance the water environment should be identified.

Water Quality

Discharges to all controlled waters require either an NRA consent or HMIP authorization. NRA consents are set to ensure that the water quality targets are met. The NRA samples consented discharges. Non-compliance is dealt with through a strong enforcement and prosecution policy.

The NRA is committed to maintaining and improving the quality of rivers, estuaries, and groundwater through the exercise of its power to control, prevent, and remedy pollution. Specifically, the NRA seeks to maintain waters that are already of high quality, improve waters of poorer quality, and ensure that all waters have appropriate quality for their agreed uses.

In order to achieve these goals, water quality targets are set for our rivers. These provide a planning framework for guiding water quality management decisions. The targets can be either statutory to meet the requirements of EU Directives, or non-statutory to meet River Quality Objectives (RQOs). It is expected that the RQOs will eventually form the basis for Statutory Water Quality Objectives (SWQOs). A timetable for the introduction of SWQOs is currently awaited from Government.

In the meanwhile non-statutory RQOs are currently being set for rivers in the Region. Each reach is assigned one of five possible River Ecosystem use classes. In addition, it is envisaged that RQOs will eventually be set to provide protection for other river uses (Special Ecosystem; Abstraction for Potable Supply; Agricultural Abstraction and Water Sports).

The NRA makes periodic assessments of river quality in order to look for geographical and temporal trends. The General Quality Assessment (GQA) scheme is used for this purpose. The scheme comprises four component "windows" on quality:

- general chemistry
- nutrients
- aesthetics
- biology.

The general chemistry component of the GQA is in current use, and encompasses six classes defined by standards for Dissolved Oxygen, Biochemical Oxygen Demand (BOD) and total Ammonia. Three consecutive years of data are used in assigning a class. The remaining "windows" are still under development.

River water quality in Thames Region has improved with 44% of watercourses assessed as "good" (class A and B) for the 3 year period 1991-1993, compared with 36.6% for the period 1988-1990. The percentage length of water course assessed as "poor" and "bad" has fallen from 17.2% to 8.3%. Improvements in river water quality should continue to take place up to a point when all statutory requirements are met and all waters have appropriate quality for their agreed uses. The planned investment in sewage/water treatment works and the sewerage system by water and sewage companies will help deliver these improvements.

The NRA also works with other regulators, industry and the public to encourage pollution prevention. Pollution incidents from point sources give rise to more than 3,500 reports from the public each year. Where pollution occurs, the NRA uses its powers to alleviate the effects and to charge costs to the polluter. This is backed up by our firm prosecution policy. We also undertake pollution prevention activities which include advisory site visits to commercial premises, promotion of best practice to industry and waste minimisation. Pollution from diffuse sources, particularly from pesticides and nitrate is less easily controlled, but is a key issue for the water environment. The NRA promotes public awareness and works closely with trade, industry, agriculture and the Waste Regulation Authorities to minimise this problem.

It is also the duty of the NRA to monitor and protect groundwater quality as it is an essential source of water for public supply, industry and agriculture, and sustains the base flows of many rivers. The NRA's document 'Policy and Practice for the Protection of Groundwater', seeks protection of groundwater through the use of controls, advice and restrictions on the way potentially contaminative activities are carried out.

Groundwater is under threat from pollution which may come either from a point source (such as industrial waste storage), or from the more widespread use of chemicals (such as the application of fertilizers and pesticides to land). In implementing the Protection Policy, maps showing groundwater vulnerability are being published (the series covering England will be complete towards the end of 1996). Specific protection zones are being defined around all public supply boreholes and other important sources. In view of the number of groundwater abstractions and the hydrology in Thames Region, these zones will cover large areas of aquifer outcrop, and will take a number of years to be defined. Consent will not usually be granted for discharges directly into groundwater because of the risk of long-term pollution.

By maintaining links with local authority planning departments, the NRA has the opportunity to be involved with the preparation of development plans and negotiations on possible future developments. In doing so the NRA aims to prevent potential problems occurring and indeed improve the existing water quality in a proactive way.

In Nitrate Vulnerable Zones farmers will have to limit the amount of nitrate applied in order to protect groundwater.

The redevelopment of urban sites often provides an opportunity to deal with contaminated land. While this is welcomed, cleaning up operations need to be undertaken with care to avoid adding to water pollution. In addition the NRA seeks strict control on landfilling especially where groundwater is used for public supply.

Guidance for Development Plans

Where development proposals would lead to a deterioration in the quality of underground or surface water they should normally be resisted unless or until appropriate infrastructure provisions have been made.

Current Sustainability Principles for Water Quality

- i) In order to maintain the amenity and nature conservation value of rivers and other water bodies, and the purity of drinking water, there should be no long-term deterioration in the quality of surface and groundwater caused by human activity.
- ii) Development, including waste disposal, which is likely to place the quality of water at risk should be resisted, at least until any necessary infrastructure to protect water quality is in place.
- iii) Monitoring the quality of water is essential to determine if waters are of an appropriate quality for their agreed uses, and for identifying where improvement is justified.
- iv) Initiatives which would lead to an improvement in water quality should be identified and encouraged, and the principles of waste minimisation and good pollution prevention practice should be promoted.
- v) Financial penalties should be imposed to deter potential polluters.

Flood Defence

The NRA aims to provide effective defence for people and property against flooding from rivers and sea. We aim to manage flood risk through development control, improvement works, maintenance works, flood warning and emergency response. Our policy has two complementary elements, the protection of both tidal and non-tidal floodplains from development and the control of surface water at or near its point of origin.

The continued loss of floodplains to development is of deep concern to the NRA. A new agreement entitled 'Development and Flood Risk' has been signed with the local authority associations. It seeks to make a proactive input to the development plan and control processes by the provision of data and advice on flooding. In recent years, the NRA has had considerable success in securing the inclusion of flood defence policies in development plans. However, local planning authorities are responsible for development decisions and the NRA can only make recommendations concerning individual development proposals within the floodplain.

The natural floodplains of the Region form a vital part of the total water environment. They are hydrologically important in limiting flood risk both through storage of water and providing flood flow routes in times of flood. They also comprise valuable wildlife corridors and wetland habitats, open space and recreational areas.

In the area of the tidal Thames the target standard of protection is from a flood with a return period of 1 in 1000 years. No objection is raised to commercial and industrial development, or the development and redevelopment of sites within built-up areas, that are adequately protected by tidal defences. Outside built-up areas, the NRA opposes all residential development on land liable to tidal flooding within the Thames Estuary.

In carrying out flood defence works, the NRA ensures that opportunities for conservation and enhancement of the environment including the provision of recreational and amenity facilities, are identified and implemented where justified.

The construction of the Maidenhead, Windsor and Eton Flood Alleviation Scheme was approved early in 1995. Studies are also in hand to assess the need for a comparable scheme in the future for the section of the non-tidal Thames downstream from Maidenhead.

The level of risk in floodplain areas depends on the management of surface and groundwater in the rest of the catchment. Techniques to control surface water run-off at or near the point of rainfall represent a significant change from traditional surface water disposal practices. With the help of these methods, development may take place without exposing downstream settlements to increases in flood risk or rates of riverbank erosion. Such 'source control' techniques, combined with negotiated agreements over proposals for works which are subject to consent under the Water Resources Act 1991, can conserve and enhance the environment associated with development.



The Lower Colne Flood Alleviation Scheme has taken account of the high environmental value of the river corridor. Silverbeck Weir is a fine example of a sensitively designed flood defence structure.

Guidance for Development Plans

Where new development would be at direct or unacceptable risk from flooding or would aggravate the risk of flooding elsewhere to an unacceptable level proposals should be resisted.

Current Sustainability Principles for Flood Defence

- i) Effective defence for people and property against flooding from rivers and the sea should be provided, together with adequate arrangements for flood forecasting and warning.
- ii) Inappropriate development within floodplains should be resisted where such development would be at risk from flooding or may cause flooding elsewhere.
- iii) Flood defence is an intervention in natural processes and therefore a balance has to be struck between maintaining and supporting natural floodplains and alleviating flood risk.
- iv) Floodplains should be safeguarded to protect their vital role in allowing for the storage and free-flow of flood waters.
- v) To minimise any increased surface water run-off, new development must be carefully located and designed. Where appropriate, source control measures should be incorporated into the scheme.



The Thames Barrier.

Fisheries

The NRA has a duty to maintain, improve and develop fisheries. To achieve this the Authority has a strategy which seeks to balance recreational and commercial fishing with the conservation of fish populations. The strategy's key elements are:-

- protection and conservation of salmon, trout, freshwater fish and eel fisheries
- regulation of fishing and the raising of income through licensing
- powers to deal with illegal fishing methods
- powers to require the construction of fish passes on weirs or other dams
- powers to control the movement and introduction of fish into any waters other than fish farms
- duties to control fish disease
- monitoring of fish stocks.

Current Sustainability Principles of Fisheries

- i) Fisheries shall be maintained, improved and developed in order to optimise the social and economic benefits from their exploitation. Unsustainable exploitation for either recreational or financial gain needs to be controlled.
- ii) The promotion of good angling practice should be supported and encouraged.
- iii) Opportunities to restore and rehabilitate damaged fisheries should be identified and the monitoring and evaluation of fisheries should be carried out.
- iv) Emergency incidents involving fish should be responded to quickly and efficiently.

There is a widespread public interest in the well-being of fisheries and concern that local rivers are clean enough to support fish populations. Good angling practice is promoted which includes care of the whole river environment. The NRA seeks to identify and prevent potential problems caused by development through active involvement in the planning process.



A healthy fish population indicates a healthy river NRA staff carry out an electrofishing survey on the River Evenlode to identify the abundance, diversity and condition of the fish stock.

Conservation

Conservation is an integral part of all the NRA's statutory duties and functions. The NRA seeks to protect and manage natural and man-made features of special interest to ensure that the resource will be valued. This will be achieved either directly through the Authority's own operational and regulatory activities by acting in partnership with other organisations, or by influencing the activities, of others. An effective input to the planning system is paramount to ensure that conservation is fully taken into account in the development plan and development control processes. In this way, the adverse impacts of development on the water environment are minimised, and the potential benefits maximised.

The Authority's Conservation Strategy is underpinned by the following key objectives:

- to assess and monitor the conservation value of inland and coastal waters and associated lands
- to ensure that the NRA's regulatory, operational and advisory activities take full account of the need to sustain and further promote conservation
- to conserve and enhance the quality of aquatic and related environments for the benefit of wildlife and people.

The NRA will ensure its own activities are planned and executed so that the potential disturbance of special features is minimised; that the materials used are appropriate; and that opportunities to enhance the aquatic and associated environment are identified and promoted where possible.

Pinkhill Meadow Nature Reserve. This joint project between Thames Water Utilities and the NRA has produced a variety of wetland habitats supporting a wide variety of wildlife.

Guidance for Development Plans

Local Planning Authorities should promote and support initiatives which seek to conserve and enhance the natural elements of river corridors and other waterside areas.

Current Sustainability Principles for Conservation

- i) Wildlife, landscape and archaeological features associated with inland waters should be conserved and enhanced to ensure the resource will be valued and made available to the benefit of present and future generations.
- ii) Public awareness of, and involvement in, caring for and respecting the aquatic environment should be increased.
- iii) The amenity and conservation value of natural floodplains should be maintained and, where possible, improved opportunities for enhancement should be identified and implemented where justified.
- iv) To conserve and enhance current levels of biodiversity.



Recreation and Navigation

The NRA aims to develop the amenity and recreational potential of waters and associated riparian land. In the performance of all its functions it has a duty to take account of recreation. In practice this means promoting the use of water and associated land for sport, recreation and the enjoyment of natural and historic landscape. The Authority will where practicable also ensure that water and land under its control is made available for the full range of water-based recreational activities, taking into account the needs of persons who are chronically sick or disabled.

The NRA aims to improve and maintain inland waterways and their facilities for use by the public, where the NRA is the navigation authority. It will perform these navigational duties in close co-operation with other NRA functions. Within the Thames Region, the NRA is responsible for navigation on the River Thames upstream of Teddington and on a short stretch of the River Kennet. An assessment of the full potential in sustainable terms of commercial transport, particularly of bulky goods, on navigable waters needs to be made. There may also be some further potential in the transportation of passengers on the River Thames in London.

The NRA is sensitive to the potential conflict between its duty to promote the recreational use of inland waters and its effect on conservation. Inevitably a balance must be struck, to avoid unacceptable and permanent damage. Potential conflicts also exist between certain recreational activities, eg. fishing and boating. The NRA will seek to assist in balancing the requirements of all water-based recreational users.

The three year project, funded by the NRA and the Sports Council, to prepare a Recreation Strategy for the River Thames has recently been completed. The Strategy aims to optimise the River's recreational potential while conserving the landscape and heritage value. Geographically the project covers the river from its source in Gloucestershire to the Thames Barrier. The improvement of leisure and recreational opportunities downstream from the Barrier is also welcomed and encouraged.

Guidance for Development Plans

Local Planning Authorities should promote and support initiatives for appropriate water-based recreation.

Current Sustainability Principles for Recreation and Navigation

- i) Leisure should be encouraged in ways which would contribute to, rather than detract from, the quality of the water environment. This may mean limiting access under some circumstances.
- ii) However, any development of the amenity and recreational potential of inland waters and associated land should be managed so that the environment is sustainable in the long term.
- iii) The encouragement of river transport could have a positive impact on the environment generally.



4. Water Related Assets



4. The Water Environment and Sustainable Development

National Policy on Sustainable Development

The Government has set out its views on sustainability in 'Sustainable Development - The UK Strategy'. Some of the principles in this document such as the precautionary principle are beginning to emerge both in Planning Policy Guidance Notes and in Regional Planning Guidance. It is now an essential element of development plans and planning decisions. Environmental appraisals of all development plans are seen as ensuring that sustainability objectives are promoted.

Furthermore the same theme runs through the Government's recent consultation document 'Quality in Town and Country'. The water environment has an important contribution to make to the quality of both town and country. The NRA therefore has a significant role to play. Development pressure points are likely to provide opportunities for environmental enhancements where there are significant land use/water issues. Better co-ordination between the NRA and development planning and control will help to realise such opportunities.

As guardians of the water environment the NRA has an influential role in promoting sustainability in the development process. 'Thames 21' creates a bridge between the management of the water environment and the development process. This chapter identifies the key strategic development issues for the water environment and the sustainability principles relating to the NRA's core functions which are contained in the Government's Regional Planning Guidance Notes relating to the Thames Region. The final chapter describes the major development locations in the Region and sets out the key catchment planning issues.

Key Development Issues for the Water Environment

Sustainability is sometimes seen as being opposed to development. However the NRA takes the view that conflict between economic development and the environment is not inevitable. Constructive dialogue with local authorities and developers can lead to optimum solutions. There are opportunities to maximise the potential of development schemes, in particular 'brownfield' development, in terms of both environmental conservation and enhancement. Within the constraints imposed by irreplaceable environmental assets the NRA addresses the requirements for development and considers how they can best be accommodated. The NRA's approach to development is concerned with the quality and quantity, and its general appropriateness including geographical location of development.

The key strategic planning issues with which the NRA will be primarily concerned in the Thames Region may be summarised as follows:

- The impact of major developments on the water environment and water resources.
- The impact of major infrastructure proposals on the water environment.
- The effects of discharges on water quality.
- The effects of pollution on groundwater.
- The impact of mineral extraction on the water environment.
- The impact of waste disposal on the water environment.

ADVICE ON SUSTAINABLE DEVELOPMENT FROM REGIONAL PLANNING GUIDANCE (RPG)

Water Resources

- Water supply issues must be taken into account in development plans.
RPG9 4.33 RPG10 4.27
- Local planning authorities should ensure that proposals in development plans are realistic in terms of the likely availability of adequate water supply and will not compromise environmental objectives. *RPG9 4.37*
- Measures to reduce demand for water, including recycling and reuse schemes, should be incorporated into development wherever practicable, particularly in areas where resources are short. *RPG9 4.34*
- The rate of development should take into account the ability of the existing infrastructure to meet the demands for water and the timing required to make new resources available to meet levels of development anticipated in the longer term. *RPG9 4.35*

Water Quality

- Sewerage issues are to be taken into account in development plans. Rates of development should not exceed the capacities of existing or planned infrastructure. *RPG9 4.33*
- The impact of sewage discharges on the water quality of rivers and streams must be considered and local planning authorities should ensure that proposals in their development plans are realistic in terms of the availability of adequate sewerage infrastructure. Development must not outstrip the provision of infrastructure and its upgrading and environmental objectives should not be compromised. *RPG9 4.36*
- Waste management issues must be taken into account in development plans which must show broad areas of search for waste developments and must set out criteria for the acceptability of sites. *RPG9 4.51*

Flood Defence

- Local authorities should take flooding into account in the planning process and should resist inappropriate development, where such development would be at risk from flooding or might aggravate flooding elsewhere. *RPG9 4.26 RPG10 4.33*

Fisheries, Recreation, Conservation and Navigation

- The River Thames should be seen as a major leisure and recreation resource of international significance requiring a balance to be struck between conflicting priorities. *RPG9 6.34*
- Local planning authorities are encouraged to promote and support initiatives which seek to conserve, restore or enhance the landscape of the Region including the natural elements of river valleys and the water environment. *RPG9 4.25*
- Mineral planning authorities should recognise that a balance must be struck between the economic and environmental requirements of the community. They should also ensure that future permissions for mineral extraction should be in accordance with the principles of sustainable development. *RPG10 8.6*
- Degraded areas should be enhanced where they are compatible with conservation objectives. *RPG10 3.4*
- Recreation based on rivers and lakes should be consistent with the principles of sustainable development. *RPG10 7.6*

Regional Planning Guidance and the Water Environment

The NRA has contributed to the preparation of Regional Planning Guidance both for the South-East (RPG9) and for the South-West (RPG10). The NRA's interests are well reflected in these documents, whose advice is based on sound sustainability principles. For instance RPG9 states that:-

"One of the challenges facing the South-East is to achieve development that is compatible with the objectives of sustainable development".

And RPG10 states that :-

"Sustainability should be the cornerstone of the Region's development plans and planning decisions."

However, the Regional Planning Guidance for the South-East stresses the need to provide for market-driven development and for sufficient housing to meet the needs of the Region. The inclusion of the water interests in Government Advice is seen as a major advance towards integrating water considerations in the development plan system. Furthermore it clearly identifies the NRA's role in influencing future patterns of development.

Taken together the Regional Planning Guidance Notes covering the Thames Region address these issues. These principles provide a sound basis for the planning of the water environment. Applying them should result in an enhanced stock of environmental assets. They contain advice to County Councils concerning the water environment which is set out opposite on page 22.



'Brownfield' sites provide the NRA with opportunities for collaborating with the development industry to achieve environmental enhancements. The redevelopment of a derelict industrial site in the centre of Watford has resulted in the restoration of the watercourse of the River Colne and an improved standard of flood defence.

(Photograph supplied by Tesco Stores)

CURRENT NRA INITIATIVES TOWARDS SUSTAINABLE DEVELOPMENT

A) Surface Water Management

Planning authorities and the development industry need to be aware of techniques for the disposal of run-off and constraints relating to groundwater which are appropriate to any particular location. These include physical limitations imposed by geology and the policy restrictions imposed for the protection of groundwater quality. It is intended that zoning maps shall be produced on a catchment basis showing the geological and water quality restraints on the disposal of run-off from developments to groundwater. These will enable the NRA to recommend best practice for source control measures.

B) Minerals

The County Councils as mineral planning authorities are required to draw up minerals plans for their areas. Advice is provided in Mineral Planning Guidance Notes, notably No 6 (MPG 6). This attempts to resolve the competing claims of the construction industry for raw materials on the one hand and of the environment on the other. It stresses that local planning authorities should have regard to NRA policies (para 97) and deals with the importance of environmental considerations and the principles of sustainable development (paras 23-25). It acknowledges that future sources of aggregates are likely to become increasingly constrained in terms of areas of the Country where they can be acceptably worked.

Aggregates are likely to be a major issue in almost all Catchment Management Plans both because of the location of riverine gravels and because their extraction is bound to have a major impact on the water environment.

The NRA is carrying out a study of the main mineral bearing areas which builds on the study, already completed, into the environmental capacity of the Cotswold Water Park. It examines the other major mineral extraction areas in the region and will recommend to mineral planning authorities appropriate thresholds for mineral extraction based on after-use and the intrinsic merits of the environment.

C) Sewerage Capacity

The capacity of sewage treatment works, particularly in rural areas, can be a significant factor in the location of development. Where the quality of the discharge from sewage treatment works is near the limits for the consented discharge new development can result in a deterioration of water quality. The NRA is able to advise where development could result in a river failing to meet its water quality objectives.



The NRA seeks to secure appropriate after-uses for mineral sites. Parts of Amwell Quarry in the Lee Valley Regional Park have been restored for nature conservation.

D) Definition of Floodplains

The NRA is currently formulating a programme of defining floodplains for use by local authorities in land use planning. Because of the scale and complexity of the work it will proceed on the basis of priorities of where the requirement is most immediate. Within the Region this is on an analysis of the major development locations described in Chapter 5.

E) Water Efficiency and Demand Management

Making efficient use of water is an integral component of the NRA's strategy for the sustainable management of water resources. The NRA (Thames Region) will shortly be publishing a consultation document which will increase public awareness of the need for economy in the use of water, and seeks to balance the needs of abstractors with those of the water environment. The water companies will, for instance, be required to demonstrate that they are pursuing leakage control when seeking new abstraction licences.

In promoting the more efficient use of water the NRA will be seeking to influence local planning authorities, the development industry, water companies, consumers and environmental interest groups. Demand management and the wise use of water are essential elements for securing the proper use of water resources. New developments, for instance, provide an excellent opportunity to promote water efficiency through promoting water saving devices, pressure control and metering at an appropriate tariff.

F) Policy Options for Waste Disposal

The NRA has commissioned a study of waste management issues relating to the water environment in the Thames Region. It focuses on both land use and technical issues. In the light of this scoping study a range of policy options is identified which could influence waste planning management into the next century. In the context of the NRA's statutory duty to conserve and enhance the water environment, it is appropriate for the NRA to develop a sustainable strategy towards waste disposal activities.

G) Habitat Enhancement and Rehabilitation

The NRA is undertaking a programme of activities aimed at enhancing and rehabilitating the physical habitat of the river corridors and floodplains. This includes rehabilitation of instream features and flood meadows. The reservation of buffer zones along river banks to mitigate the effects of run-off from urban areas, roads and farmland is encouraged. Acknowledging that the health of the river eventually reflects the land use within the entire catchment, the NRA recognises that the interests of the water environment extend far beyond the floodplain.

H) Indicators

The NRA is working on the definition of a set of indicators which may be used to monitor the state of, and changes to the water environment. Indicators need to take account of the activities of the NRA and also the actions of other organisations, groups or individuals, many of which relate to the water environment through land use planning and the control of land use change.

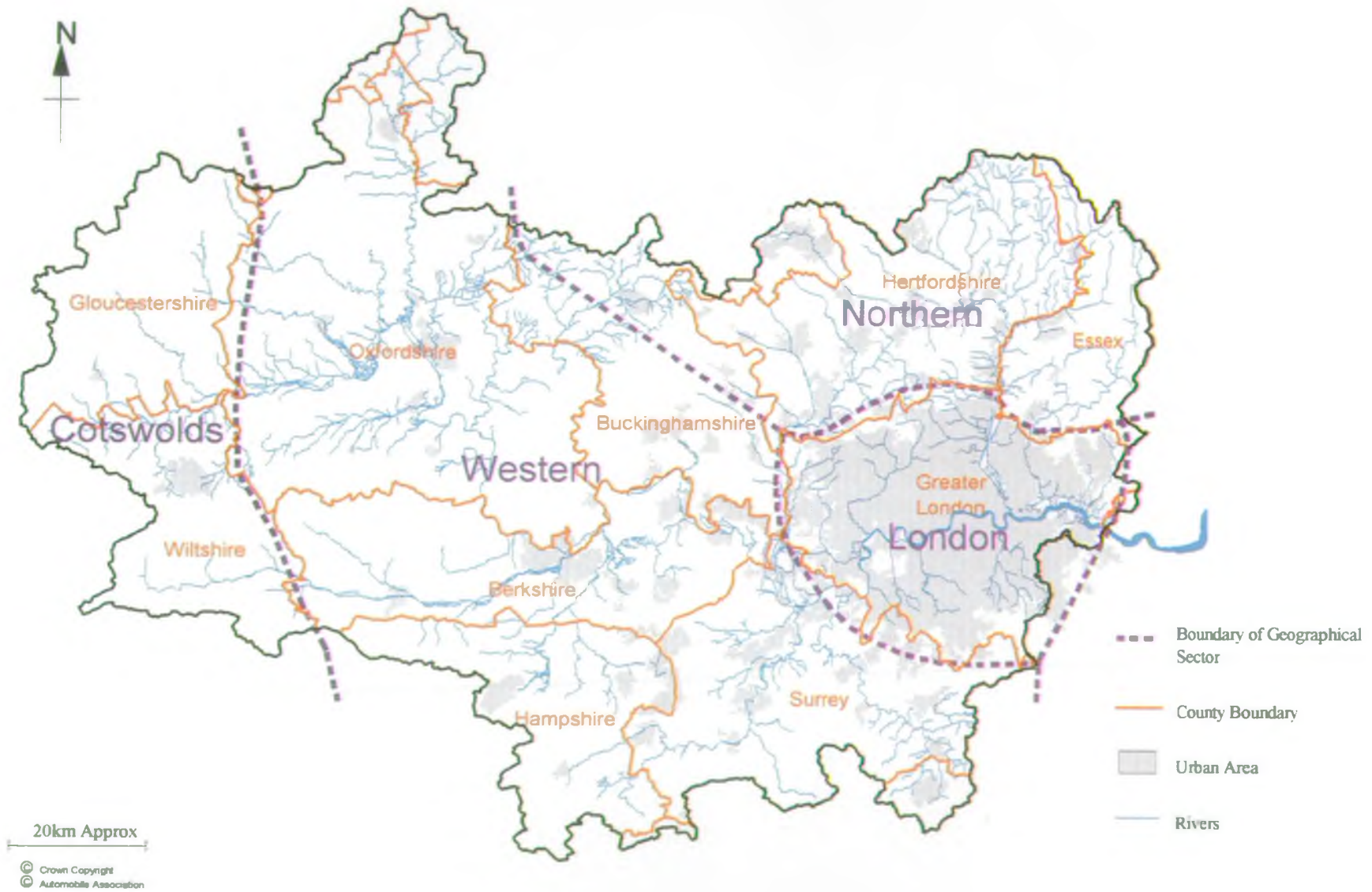
As a first stage the project is seeking to identify key water related attributes or assets. Appropriate indicators will then be developed to measure success in protecting or enhancing each asset or attribute over time. Indicators will need to be technically sound, objective and easily understood.

This information will be useful to local planning authorities seeking to monitor the effectiveness of their land use planning policies. It will also be important to the NRA in measuring the effectiveness of its own actions.

I) Research and Development

Cross functional issues related to the statutory Town and Country Planning system are now recognised as a self contained Research and Development topic. A wide range of projects is being carried out with the aim of improving the effectiveness of the NRA's role in its interface with local authorities and other organisations concerned with planning matters.

5. Geographical Sectors in the Thames Region



5. Major Development Locations

The NRA's Thames Region comprises the main drainage basin of the River Thames and its tributaries including, from west to east, the Cherwell, Thame, Kennet, Loddon, Colne, Wey, Mole, Lee and Roding.

It is the most developed and densely populated of the eight NRA regions. It has a resident population of nearly 12 million people, and covers about 13,000 square kilometres. It stretches from Cirencester in the west to Dartford in the east, and from Luton in the north to Crawley in the south. The Region is one of great diversity ranging from the rural west, through the high-tech industry of the Thames Valley, to the metropolitan built-up area of London where over half the Region's population lives. Fourteen counties, fifty eight district councils and thirty three local planning authorities in London lie wholly or partly within the Region.

The River Thames, its tributaries and its estuary are a national asset of worldwide renown. Not only does the river system provide important commercial and water supply benefits, but it also caters for a wide variety of recreational uses, and supports a high level of ecological diversity. This highlights the need for any development to be carried out in an environmentally sensitive manner. It is therefore important to conserve and enhance the character, ecology and landscape setting of the River.

The Thames Region faces considerable development pressures. A recent study by the Henley Centre identified areas in both growth and decline. Out of a list of 25 locations in England and Wales which are likely to boom at the turn of century, nine are within the Region compared with only one of the 25 identified as being in decline. In geological terms the Region contains extensive areas of limestone, chalk and river gravels and this has led to a continuing programme of mineral extraction. Growth in housing and infrastructure has placed pressures on the water environment. These include pressure on water resources and water quality. Development in floodplains, often against the advice of the NRA or its predecessor authorities has had permanently damaging results.

In analysing the major development locations we have sought to assess them in terms of the impact of development on the water environment and whether the development would be sustainable in that context. This has enabled us to identify a series of catchment planning issues to be addressed in Catchment Management Plans. Regional Planning Guidance provide an analysis of geographical sectors which are based on prevailing economic conditions. The analysis of the major development locations is based on these sectors and NOT on the operational Areas of the NRA's Thames Region. The sectors which affect the Thames Region are:-

- **The Cotswolds**
- **The Western Sector**
- **The Northern Sector**
- **London**



The Thames at Abingdon

6. The Cotswolds



0 5 10 15 20km



-  NRA Thames Region Boundary
-  Sector Boundaries
-  County Boundary
-  District/Borough Boundary
-  Urban Area
-  Rivers
-  Motorway
-  Motorway Widening
-  Proposed Major Highway Schemes
-  Major Development Location
-  Major Residential Development - Permitted and Proposed
-  Major/Extensive Gravel Workings - Operational & Proposed
-  Minor/Isolated Gravel Workings - Operational & Proposed
-  Major Engineered Landfill Sites - Operational & Proposed
-  Existing & Proposed Incinerator Sites
- Water Supply Area of Concern:**
-  Possible Deficit 2015-2021
-  Possible Local Deficit in Times of Peak Demand 2011-2021
-  Potential Deficit from 2001
-  Regional Priorities
-  Cotswold Water Park

The Cotswolds (North East Wiltshire and South West Gloucestershire)

The Upper Thames Basin lies in the South West Planning Region. This has been an area of rapid growth in recent years brought about by a combination of high environmental quality and greatly improved communications. Swindon is now a major regional centre of population, economic activity and services. Land to the south-west and north of the town is designated as a 'rural buffer zone' and should continue to be protected from inappropriate development.

Swindon (Upper Thames Catchment)

Development Pressures and Planning Issues

The area to the north of Swindon, known as the Haydon Sector, is under intense pressure to accommodate further housing and employment development. The area has a potential population capacity of 27,000. The town, situated just to the north of the M4, has grown mainly as a result of 'high tech' industries locating here because of the good communication links.

Water Related Assets

- The River Ray flows through Swindon, where it provides a key open space.
- An amenity lake has been formed as part of the Haydon Sector development which complements the Mouldon Hill Country Park.
- The River Ray is heavily used for effluent disposal. The Swindon Sewage Treatment Works has recently been upgraded resulting in markedly improved water quality in the River Ray and a healthier river ecosystem.
- The River Ray downstream of Swindon has been designated as a 'Sensitive Area' under the Urban Wastewater Treatment Directive.

Key Catchment Planning Issues

There are already limited water resources in the Swindon area where local resources are supplemented by imported water resources mainly from Farmoor Reservoir in Oxfordshire, and also from Axford on the River Kennet. Existing resources can sustain currently planned levels of local development in the Upper Thames area (including the Swindon Northern Sector), but the management of growth in water demand is critical. Therefore, demand management techniques must be incorporated into development proposals. If current levels of development continue, however, the development of a major new water resource may be required at the turn of the Century.

The low water quality of the River Ray is attributed to the impact of urban pollution and intensive agriculture. Discharge consents for any new development/activity should therefore meet, and where possible, enhance river quality.

Opportunities for improving the River Ray corridor through new development and through the creation of the Great Western Community Forest should be maximised. This may lead to improved habitats and a higher nature conservation value.

Cotswold Water Park (Upper Thames Catchment)

Development Pressures and Planning Issues

The Cotswold Water Park has been created by the extraction of gravel in the Upper Thames area. The Park covers some 5,700 ha and is the largest concentration of gravel pits and associated land in Great Britain. Gloucestershire and Wiltshire County Councils have indicated an intention to extend the proposed area of mineral working to include an additional 4000 ha of land to the east of the A419 in response to the anticipated demand for aggregates.

The Park area is also under pressure for recreation and tourism developments such as the Lakewood Holiday Village, and an hotel and restaurant development on the 'Gateway' site.

Proposed road schemes, such as improvements to the A419 and several village by-passes together with the approved Latton by-pass, will improve access into the area.

The NRA's Water Resources Strategy (discussed earlier) makes reference to a number of schemes to meet future water demand if growth in demand cannot be contained. The scheme to transfer water from the River Severn to the River Thames would have an impact on the Park if it was to be implemented.

Water Related Assets

- The Cotswold Water Park area supports a wide diversity of wildlife and habitat features of acknowledged national and international importance. The water areas are ecologically important for wildfowl, and a number of wet meadows have been designated SSSIs.
- The western part of the Park is covered by two Groundwater Protection Zones based around Somerford Keynes and Cerney Wick.
- The quality of surface and groundwater is generally high.

- The River Thames and numerous tributaries flow through the length of the Park and a large proportion of the area falls within the floodplain. The floodplain provides an important flood alleviation and strategic facility which reduces discharges in the floodplain prior to reaching major urban areas downstream, eg. Oxford.
- The area is an extremely important recreational resource within the Region. Many of the lakes are already used for a wide range of water-based recreation. Informal recreation is also important and the two country parks attract many visitors. The Thames Path runs through the area.
- The disused Thames and Severn Canal bisects the Water Park. There are various proposals for its restoration.



The Thames and Severn Canal at Inglesham in its heyday. The NRA supports its restoration as a new recreational asset but recognises the major water resource implications.

Key Catchment Management Issues

The preservation and enhancement of the water environment is paramount in an area of landscape, cultural and historic value. Any development proposals which would adversely affect the landscape of the Upper Thames Valley should be resisted. The restoration of mineral workings should lead to significant landscape enhancements.

Any further development should not result in irreversible damage to the high ecological value of the area. Buffer zones should be incorporated in all mineral extraction schemes to protect watercourses and sites of nature conservation value. Opportunities to create diverse wildlife habitats through restoration of gravel workings should be promoted.

The mineral extraction and restoration in the area, together with other developments such as highway improvements and recreation, pose a potential threat to the quality and quantity of surface and groundwater. All discharges will need consent to protect surface water. The guidelines set out in the NRA's 'Policy and Practice for the Protection of Groundwater' must be followed. This is particularly important in areas covered by the Groundwater Protection Zones.

Investigations into groundwater levels and groundwater movement in the surface gravels need to be carried out.

The development proposals should not result in an increased risk of flooding, reduce the storage capacity of the floodplain, or interfere with flow routes. Where opportunities arise, the alleviation of existing flood risk should be provided. The water storage capacity of the area needs to be maintained in the interests of water resources as well as land drainage.

The route of the Thames Path should be protected from adverse change, and opportunities to enhance it and other rights-of-way should be maximised.



The Cotswold Water Park is under pressure from built development related to leisure and tourism.

7. The Western Sector (North)





- NRA Thames Region Boundary
 - ■ ■ Sector Boundaries
 - County Boundary
 - District/Borough Boundary
 - Urban Area
 - Rivers
 - Motorway
 - Motorway Widening
 - ☀ Proposed Major Highway Schemes
 - ✳ Major Development Location
 - Major Residential Sites - Permitted and Proposed
 - ▲ Major/Extensive Gravel Workings- Operational & Proposed
 - ▲ Minor/Isolated Gravel Workings- Operational & Proposed
 - Major Engineered Landfill Sites - Operational & Proposed
 - Existing & Proposed Incinerator Sites
- Water Supply Area of Concern:
- Possible Deficit 2015-2021
 - Possible Local Deficit in Times of Peak Demand 2011-2021
 - Potential Deficit from 2001
 - ✳ Regional Priorities

The Western Sector (Oxfordshire, Southern Buckinghamshire, Berkshire, Northern Hampshire, Surrey and North West Sussex)

These areas are entering a period of adjustment, enabling infrastructure and services to catch up with the recent past. There is considerable pressure for new development and it is important to ensure that the best of the environment is protected for future generations.

Banbury (Cherwell Catchment)

Development Pressures and Planning Issues

Banbury has been identified as a key development pressure area within Oxfordshire. The large scale residential, business and retail warehousing development in and around the town has had, and will have, a growing impact on water resources, particularly after 2016. Concern has also been raised over changes in run-off resulting from development in the area and the impact this may have on flood flows and water quality.

The M40 is likely to continue to be a focus for development pressures. There is the possibility of a second junction at Banbury. Run-off from the M40 has resulted in localised flooding problems, notably on the Hanwell Brook north of Banbury.

Water Related Assets

- The Cherwell Valley together with the Oxford Canal is an important recreational resource.
- There is a significant area of floodplain along the Cherwell Valley.
- MAFF has designated the Upper Thames as an 'Environmentally Sensitive Area'. This includes Otmoor, the Rivers Cherwell and Ray.

Key Catchment Planning Issues

The availability of water resources should be taken into account in planning future development for Banbury. Future demand in the medium term is to be met by transfers of water to Banbury from Farmoor Reservoir. However, if demand continues in the longer term it may contribute to the need to develop larger strategic water resource schemes within the Thames area. Water demand management techniques should be promoted.

Concerns have been expressed that the flow and ecology of the River Cherwell at Banbury may be adversely affected by abstraction from the River for public water supplies at Grimsbury to the north of the town. Preliminary assessments indicate that the reductions in river flow may have a significant effect on the ecosystem of this stretch of watercourse.

The effluent discharged from Banbury sewage treatment works has remained largely undiluted and therefore has a significant impact on water quality. Water quality should be maintained at a sufficiently high level to maintain the flora and fauna, including the native crayfish population. In achieving this, discharge consents of any development/activity must not be detrimental to water quality and, where possible, enhance river quality.

Local authority planning policies must continue to be implemented in order to prevent worsening of flooding problems. The capacity, extent and natural flow routes of the floodplain in the area should be maintained. In addition greater attenuation of run-off is required using source control techniques.

Development should not result in irreversible damage to the high ecological value of the water environment in the area, and should if possible restore and enhance the corridor of the River Cherwell at Banbury.

Upper Heyford (Cherwell Catchment)

Development Pressures and Planning Issues

A new community has been cited as a possible use for the USAF Airbase which has now been vacated. The future of the site is to be decided through the development plan process and piecemeal development is being resisted in the short term. The development of the site for a new community may result in high infrastructure costs. Both the Thames and Anglian Regions of the NRA are involved in this site.

Water Related Assets

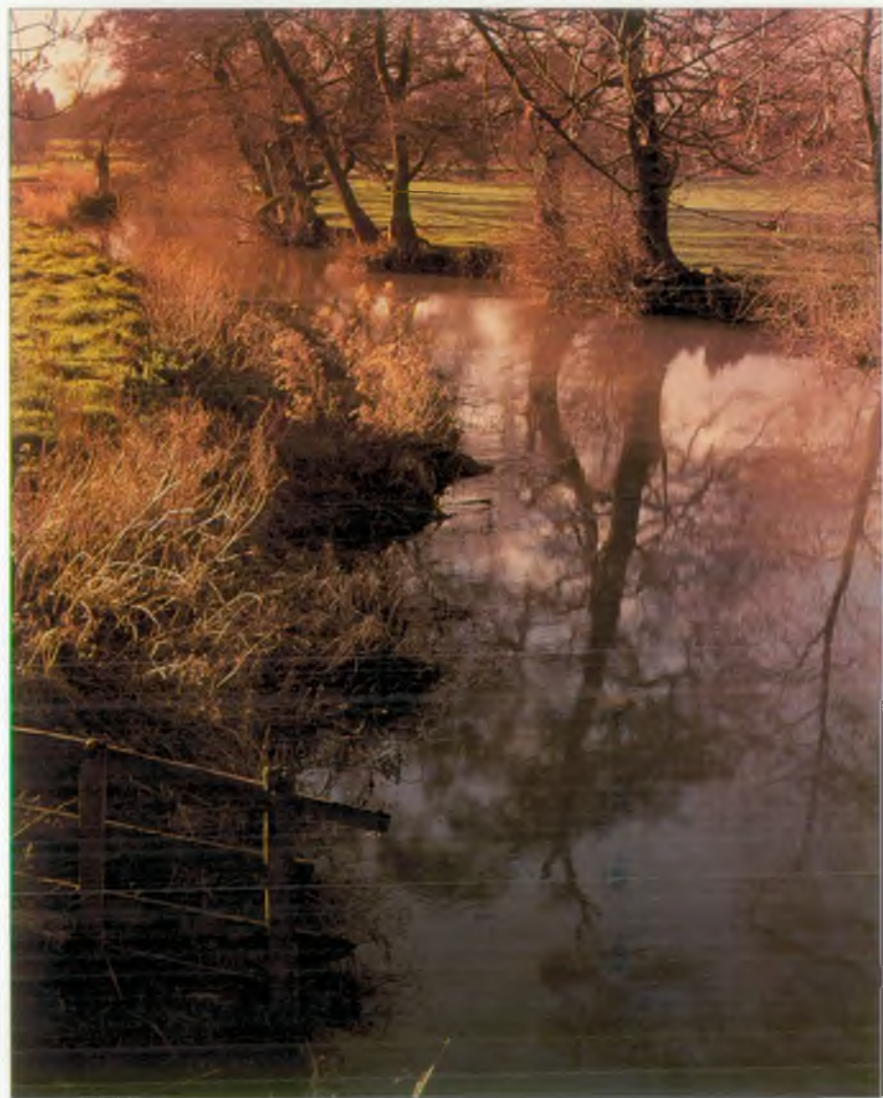
- The site is located on a highly fissured oolite limestone aquifer which is generally vulnerable to pollution. Site investigations are required.
- There are several minor watercourses. Investigations into the biota of these would be required.

Key Catchment Planning Issues

The issue of water resource availability is significant and should be investigated fully before a new settlement is allowed in this area. A new settlement should incorporate appropriate water demand management techniques to assist in containing growth in water demand.

The threat of pollution to surface water and groundwater is significant because of possible disturbance to contaminated land and the vulnerable aquifer. The guidelines contained in the NRA's 'Policy and Practice for the Protection of Groundwater' should be followed.

Any increase in surface water run-off from new development must be attenuated using suitable source control techniques to avoid worsening the flooding on the River Cherwell.



The Cherwell Valley.

Lower Windrush Valley (Thames Catchment - Buscot to Eynsham)

Development Pressures and Planning Issues

The Windrush Valley south of Witney, and particularly in the Stanton Harcourt and Standlake areas, has long been associated with gravel extraction. This extraction is likely to continue into the 21st Century with additional gravel extraction at south east Ducklington and north of Hardwick. The high water table and lack of suitable fill materials has resulted in the majority of the pits being restored to form a landscape of lakes. They are mainly used for club activities such as sailing and windsurfing. There has also been some land based development such as a banger racing circuit, an hotel, and an outdoor education centre. A golf course has also been permitted.

There is now a co-ordinated policy framework set out in the Oxfordshire Minerals Plan dealing with the restoration of mineral workings. Standlake has been allocated an area for intensive water based activities, and the Stanton Harcourt area for more passive recreation such as angling, walking and non-intrusive water sports. Other lakes at Ducklington, Stanton Harcourt and Northmoor have been set aside for nature conservation. A flood alleviation scheme is proposed at Standlake.

Further development is proposed at both Witney and Carterton.



Water Related Assets

- The Windrush Valley is an important landscape feature.
- The River Windrush has an extensive floodplain associated with it.
- An Environmentally Sensitive Area has been designated on the Upper Thames including the River Windrush.
- The River Windrush has an exceptionally high biological quality and contains a widespread population of native crayfish.
- There are two notable SSSIs in the area: Vicarage Pit near Stanton Harcourt is an old gravel pit now managed as a local nature reserve, and Ducklington Mead.

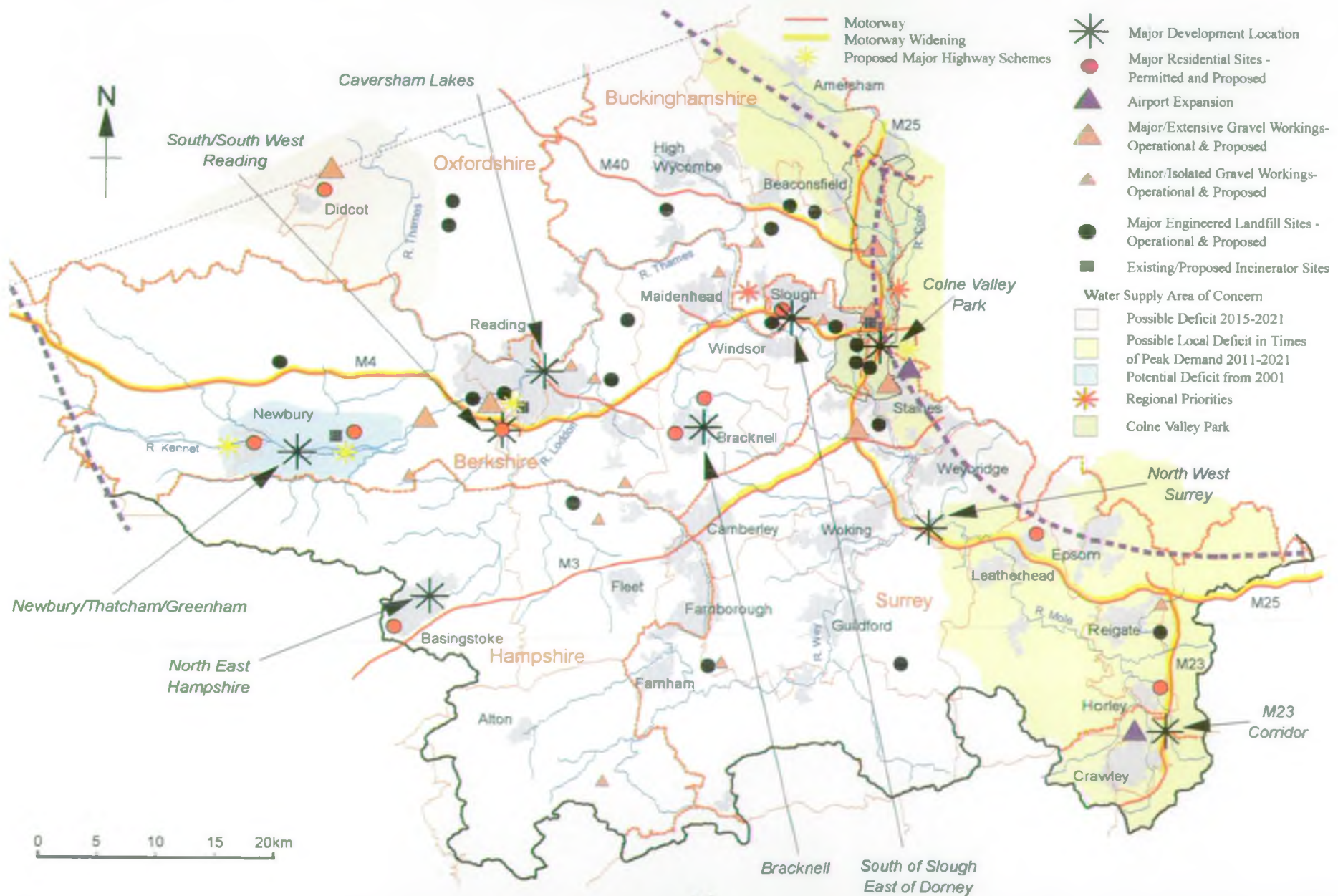
Key Catchment Planning Issues

A balance has to be maintained between the recreational opportunities and the nature conservation interests of the area. Any further recreational development should not result in a loss of natural habitats or wildlife species.

Flooding in the area is quite extensive. At Standlake, in particular, flooding has been caused by gravel extraction which has altered the topography of the land. The gravel pits have been bunded which interferes with the flow of flood waters and causes increased flooding downstream. Further mineral working is limited, but any additional interference with the floodplain in the area should be avoided. Any future proposals for either built development, or mineral extraction should incorporate suitable measures to attenuate any increase in surface water run-off.

The water quality of the River Windrush should be maintained at a sufficiently high level in order to maintain the native crayfish population. Widening and deepening of the channel has caused a loss in natural habitat in places. Work is taking place to reinstate these habitats.

8. The Western Sector (South)



Newbury/Thatcham/Greenham (Kennet Catchment)

Development Pressures and Planning Issues

The Draft Berkshire Structure Plan allows for some 4300 dwellings in Newbury District 1994-2006 excluding permissions outstanding at 1994. A large proportion of this is anticipated to come forward on as yet unidentified small sites. The main areas for house building will be at Newbury and Thatcham. Land to the north east of Thatcham is already committed for the development of 1100 dwellings, associated facilities, and road improvements. In addition, there is an existing large industrial area to the east of Thatcham which is likely to be extended.

The proposed A34 by-pass for Newbury has been recently approved.

There are recreational pressures on the Kennet and Avon Canal. At Thatcham there is an area of worked gravel pits and a new marina is proposed. Further mineral extraction is proposed at Chamberhouse Farm, Thatcham in the Draft Berkshire Minerals Plan.

The USAF Airbase at Greenham Common has been vacated and planning permission for leisure and employment uses has been applied for.

Water Related Assets

- The River Kennet and Kennet and Avon Canal run through and adjacent to Newbury, and to the south of Thatcham. Both form important landscape features and are popular for recreational uses. The water quality is high.
- The River Lambourn provides a major natural landscape feature separating Newbury and Donnington and should be protected.
- The River Enbourne runs close to Greenham Common and supports a good fishery.
- The River Kennet has a substantial floodplain. At Thatcham the floodplain is restricted south of the built up area, but at Newbury the urban area is subject to flooding.

- The gravel pits at Thatcham Moors, to the south west of Thatcham, have now been restored to recreational lakes and used mostly for angling. A local nature reserve has been established on the north side with an education/discovery centre.
- Thatcham Reed Beds support an SSSI. Stretches of the Kennet and Lambourn Rivers are proposed SSSIs.
- There is a Groundwater Protection Zone to the west of Newbury including part of the Kennet Valley.

Key Catchment Planning Issues

The proposed new housing in the area will bring forward the need for additional water resources possibly by transfer from Reading. This should be taken into account in the rate of development, and demand management should be promoted by encouraging the use of water saving devices. Source control measures to attenuate the increase in surface water run-off must be incorporated into new development to avoid further flooding of the River Kennet.

The guidelines contained in the NRA's 'Policy and Practice for the Protection of Groundwater' should be followed to avoid the possibility of polluting groundwater and surface water especially where development involves the disturbance of contaminated land at Greenham.

The proposed mineral extraction at Chamberhouse Farm should not effect the hydrological regime of the Thatcham Reed Beds SSSI either through extraction or restoration. A water level management plan should be prepared. The restoration of the site will present an opportunity for the enhancement of the reed beds.

There are continuing water supply problems for the Kennet and Avon Canal which may lead to pressure for extra demands on adjacent ground and surface water sources. An evaluation of water supply needs and the availability of water resources is being carried out.

South West Reading (Kennet Catchment)

Development Pressures and Planning Issues

The Draft Berkshire Structure Plan for 1991-2006 proposes that a proportion of the County's housing provision should be accommodated in Newbury and Wokingham Districts to meet the needs of Greater Reading. In the past potential development areas discussed have included the Kennet Valley to the south-west of Reading and north of the M4, and south of the M4 and west of the A33. The development could take the form of either an expansion of the existing built-up area of Reading, a new settlement, or the expansion of several smaller existing settlements. The M4 to the south of Reading is to be widened, and the A33 relief road from the M4 into the centre of Reading is currently under construction. The construction of a motorway service station is also underway.

The area has been subject to intensive mineral extraction and waste disposal to landfill.

Water Related Assets

- The area contains the Rivers Kennet and Loddon, and the Foudry Brook, and a number of water meadows including Fobney Meadows. The watercourses are of high ecological importance supporting a good diversity of flora and fauna, and providing valuable wildlife corridors.
- Water Quality is good to fair.
- There is a water-based SSSI at Standford End Mill near Beech Hill, on the River Loddon.
- Parts of the area are covered by Groundwater Protection Zones: Fobney Meadows; towards Theale in the West; and at Beech Hill.

- Large stretches of land to the south-west of Reading lie within the floodplain of the River Kennet.
- The worked out gravel pits provide for a wide variety of water sports from water skiing to fishing.

Key Catchment Planning Issues

The guidelines set out in the NRA's 'Policy and Practice for the Protection of Groundwater' should be followed because of the threat of pollution to groundwater and surface water particularly from minerals extraction and waste disposal, the motorway service station, and highway construction.

If large scale housing and associated development were to be allowed north of the M4 the NRA's policy regarding the protection of floodplains could be seriously undermined. Such development would entail land raising and flood defence measures resulting in interference of flood flow routes and loss of capacity of the floodplain. As this area lies upstream of Reading there may be significant implications for flooding in the Reading built-up area. Source control measures should be incorporated into any new development in order to attenuate increased surface water run-off and avoid aggravating the current flooding situation.

Any development should not result in irreversible damage to the high amenity and ecological value of the water environment in some parts of this area. Opportunities to improve and enhance other parts despoiled by minerals extraction and waste disposal should be maximised, and development adjacent to rivers should secure river corridor improvements and enhancements.



The Kennet Navigation.

Caversham Lakes (Thames Catchment - Benson to Hurley)

Development Pressures and Planning Issues

Sand and gravel has been worked in this area for many years and most of the old workings have now been restored as lakes. According to Oxfordshire County Council there is only limited scope for additional mineral working, although a minerals operator is interested in extending the site to include an area at Sonning Eye.

The lakes are used for recreational purposes, particularly for sailing. There is a marina linked to the River Thames. South Oxfordshire District Council is keen to develop recreation in the area further provided that nature conservation interests are protected.

There is a possibility of an additional river crossing in the vicinity.

Water Related Assets

- The area forms an attractive part of the River Thames corridor with the Thames Path on the opposite bank.
- The floodplain of the River Thames extends across the whole area.
- There is a Groundwater Protection Zone based at Playhatch near Caversham Lakes.

Key Catchment Planning Issues

The key issue in the area is how much additional mineral working can be accommodated without having an unacceptable impact and causing irreversible damage to the nature conservation value of the existing lakes. At present, additional mineral working depends on the outcome of a Public Inquiry. Any possibility to enhance the area in terms of both nature conservation and recreational opportunities, through the permission of further mineral extraction should be maximised.

As there is a possible threat of pollution to groundwater and surface water from the minerals extraction, the guidelines set out in the NRA's 'Policy and Practice for the Protection of Groundwater' should be followed.

The capacity and flood flow routes of the floodplain should be maintained in line with NRA policy.

Bracknell (Thames Catchment - Hurley to Teddington)

Development Pressures and Planning Issues

The land to the north of Bracknell and south of the Green Belt has been under pressure to accommodate large-scale housing development since the early 1980s. The area has been identified for residential development in the Berkshire Structure Plan, and a number of large planning appeals for housing development were allowed. Development is currently underway - in total approximately 3500 dwellings will be built. In addition the draft Local Plan identifies further large sites for housing at: a) Peacock Farm (1200 dwellings), b) RAF College site (230 -900 dwellings).

Water Related Assets

- The Cut and Emm Brook are the two main watercourses running through the area.
- Parts of the area lie within the 1947 floodplain of The Cut.
- Existing lakes in the area are used for on-line storage.
- The area has a high amenity value. There are two SSSIs; at Chawridge Bank and a wet woodland site at Wykery Copse.

Key Catchment Planning Issues

The impact of development on the amenity value of the area, particularly in the river corridors, is of some concern. Development proposals should aim to maintain the landscape and conservation value of the watercourses.

Development within the floodplain should be resisted in order to maintain the capacity, extent and natural flows at time of flood, and to avoid altering the flooding pattern downstream. Source control measures should be incorporated into development proposals in order to attenuate any increase in surface water run-off. This is of particular importance in respect of the Emm Brook which has a limited capacity.

South of Slough/East of Dorney (Thames Catchment - Hurley to Teddington)

Development Pressures/Planning Issues

Slough is entirely surrounded by Green Belt making it increasingly difficult to identify sufficient land to meet local housing needs. This is putting increasing pressure on greenfield sites around the town. The Local Plan makes provision for a further 1200 dwellings at Cippenham south of Slough and north of the M4. The Borough Council is also looking to release land for up to 900 houses in the Green Belt.

To the east of Dorney there is a local policy to protect the attractive character of the floodplain. There is local concern that the Eton College Rowing lake and the Maidenhead Flood Relief Channel could open the area up to an unsustainable level of recreational and leisure activity.



Flooding in Maidenhead 1990

Water Related Assets

- The River Thames runs through the area together with several other watercourses including the Boveney Ditch, Chalvey Ditch, Roundmoor Ditch and Colemorton Brook.
- Several of these watercourses suffer from poor water quality as they receive discharge from Slough sewage treatment works, and experience occasional pollution incidents.



The Maidenhead, Windsor and Eton Flood Alleviation Scheme.

- There are two Groundwater Protection Zones around Eton and the area is defined on the NRA's Groundwater Vulnerability Maps as a Major Aquifer of Intermediate Vulnerability.
- The area lies within the 1947 floodplain of the Rivers Thames and Colne.

Key Catchment Planning Issues

Large stretches of floodplain in this area have been lost to development which has exacerbated the flooding problems downstream. Further encroachments into the floodplain should be resisted to maintain the capacity and natural flow routes, and to minimise the impact of development on the landscape, conservation and amenity value of the river corridor. Source control measures should also be implemented within development schemes where there is increased surface water run-off.

Any development should follow the guidelines set out in the NRA's 'Policy and Practice for the Protection of Groundwater', particularly when it lies within a Groundwater Protection Zone, in order to minimise the threat of pollution to groundwater.

Proposed development adjacent to any water bodies should only be allowed where they secure enhancements to the landscape.

Colne Valley Park (Colne and Thames Catchment)

Development Pressures and Planning Issues

There are many development pressures in the area including the possible expansion of Heathrow and construction of Terminal 5; the relocation of Perry Oaks Sludge Disposal Works at Iver South; highway improvements including the widening of the M25, M4 and M40, and an additional spur road associated with Terminal 5; and, further mineral extraction and waste disposal proposals.

This area experiences urban fringe problems with the conflicting demands of recreation and nature conservation. The quality of restoration and after-use of mineral extraction sites has not always been of a high standard.

A management plan produced by the Colne Valley Park Standing Conference has been published providing a strategic overview for future development in the area.



The Grand Union Canal and River Colne act as a green chain to the west of London. The restoration of buildings at Coppermill enhances an attractive waterside location and offers the opportunity to develop water-based recreation.

Water Related Assets

- The area encompasses the River Thames and the River Colne system, together with a number of smaller watercourses such as the Datchet Common Brook.
- The area lies within the 1947 floodplain, and there have been instances of local flooding. A number of flood relief schemes are in operation in the Colne Valley to alleviate the problem.
- There is a complex of water related SSSIs covering the gravel pits and adjacent grazing/wet grasslands, most notably at Staines Moor and the mid-Colne.

Key Catchment Planning Issues

Development such as the expansion of Heathrow, highway improvements, minerals extraction and waste disposal all pose a possibility of pollution to groundwater and surface water. In addition, the shallowness of the aquifer increases this risk. The guidelines in the NRA's document 'Policy and Practice for the Protection of Groundwater' should be followed in order to protect the aquifer.

Further development should be resisted in order to retain the capacity and natural flow routes of the floodplain. Source control measures should be incorporated into new developments, especially the expansion of Heathrow, to attenuate the increased surface water run-off and avoid further pressures on the floodplain.

Development adjacent to water bodies provides the opportunity to secure environmental enhancements including improvements to the landscape. Development should not have a detrimental impact on the nature conservation importance of the area.

Discharge consents for any activity must meet and, where possible, enhance river quality. Water related SSSIs will need Water Level Management Plans which prescribe a target water regime and range of acceptable tolerance for each SSSI in addition to specifying any seasonal requirements.

North East Hampshire (Blackwater Catchment)

Development Pressures and Planning Issues

The Hampshire Structure Plan Review identifies the Basingstoke area for major growth. Good road and rail links and surrounding undeveloped land makes it a favourable location for further development. Various sites in the Basingstoke area have been allocated for housing but remain unbuilt. These include East Oakley, Black Dam and the Hospital site.

An extension to the Basingstoke Canal is proposed, but could lead to a water resource problem if water has to be pumped from other sources.

Water Related Assets

- The main watercourses in the area are the River Whitewater and the River Loddon.
- Basingstoke has an under-lying porous chalk geology and a Groundwater Protection Zone covers most of the town.
- The River Whitewater has a high quality salmonid fishery with a good fish population, and the upper reaches of the River Loddon support a naturally recurring brown trout population.
- The Loddon Valley is an important habitat and the ecology is sensitive to water quality and quantity, especially to the native crayfish in the upper reaches.
- There is a water-based SSSI at Mapledurwell Fen, and there are several other important fen sites in the upper catchment.

Key Catchment Planning Issues

The vulnerable groundwater chalk aquifer must be protected by following the guidelines set out in the NRA's 'Policy and Practice for the Protection of Groundwater'. Source control measures will also be required to attenuate increased water run-off from future development.

The ecology of surface waters needs to be protected to maintain the existing diversity of flora and fauna. Discharge consents for any development/activity must meet and, where possible, enhance river quality.



Integrating new highways can rarely be achieved without significant harm to the environment especially where they follow river valleys. The NRA works closely with highway authorities to minimise such damage. In the case of the Blackwater Valley Route much of the river corridor has been preserved and lakes have been sculptured to provide a new environmental asset.

North West Surrey (Thames Catchment - Hurley to Teddington)

Development Pressures and Planning Issues

The River Thames has become a focus for development with the change of use of boat yards to residential plots being allowed. Moorings are being lost, together with landing and fuelling stations. Encroachment onto the foreshore is increasing as properties are built on stilts.

The area is one of extensive gravel workings and their after use remains an issue.

Water Related Assets

- The River Thames corridor and floodplain.

Key Catchment Planning Issues

Development within the floodplain and on the foreshore of the River Thames should be resisted as it reduces the capacity of the floodplain and river, and increases the risk of flooding. The natural banks and foreshore of the River Thames support a diverse range of flora and fauna which should be protected. Any necessary development adjacent to the River should aim to enhance the amenity value of the River and its banks. The NRA(TR) has an outstanding commitment for a floodplain management scheme, covering this area. The next stage of this process will be the production of a Catchment Management Plan which will consolidate the extensive scoping work already undertaken.

The Catchment Management Plan for the Lower Thames will cover the reach from Hurley down to the Tidal limit at Teddington Weir. This reach includes the Maidenhead Windsor and Eton Flood Alleviation Scheme that has recently been approved. The Plan will review the various detailed technical planning and environmental studies carried out in the Datchet, Wraysbury Staines and Chertsey (DWSC) area and examine options for completing a floodplain management plan for that area. This will consider in particular detail the issues of flooding between Datchet and Walton Bridge and identify opportunities for enhancement.

The M23 Corridor (Mole Catchment)

Development Pressures and Planning Issues

The expansion of Gatwick Airport and the employment generated by it has led to the rapid growth of Horley and Crawley. The recently adopted Surrey Structure Plan makes provision for an additional 6890 dwellings within the districts of Tandridge, and Reigate and Banstead. This will entail the development of greenfield sites over and above that within the existing urban areas.

The urban fringe is also under increasing pressure for informal recreation.

There is a proposal to extend the gravel extraction workings at Horley.

Water Related Assets

- The River Mole is the main watercourse in the area, but there are also numerous tributaries feeding into the Upper Mole such as Crawlers Brook, Gatwick Stream, Standford Brook, and Burstow Stream.
- There are 'flashy' floods in the upper catchment caused by continued pressure from urban development.

Key Catchment Planning Issues

The NRA's guidelines set out in 'Policy and Practice for the Protection of Groundwater' must be followed to avoid the pollution of groundwater and surface water from development activity at Gatwick Airport.

Future development should not exacerbate the 'flashy' floods which occur in the upper catchment of the River Mole. Therefore source control measures should be incorporated into new development where appropriate to attenuate any increase in surface water run-off.

The impact of development on the amenity value of river corridors and other water bodies should be minimised, and where possible enhancement opportunities secured.



Cobham Mill on the River Mole, was restored as a contribution towards European Year of the Environment. It is an excellent example of how a river authority can work closely with a local community to realise a worthwhile conservation project.

9. The Northern Sector



The Northern Sector (Bedfordshire, Hertfordshire, North and West Essex, and North Bucks)

Regional guidance identifies the decline in the defence-related and motor industries having an impact and a need for economic regeneration. There is seen to be a need to restructure the local economy as well as to take advantage of development opportunities as they arise. The growth of Stansted and Luton Airports will need to be carefully reconciled with the attractive and tranquil countryside surrounding it, including Areas of Outstanding Natural Beauty and Green Belt where conservation policies are important. There are attractive areas of countryside - as, for example, the Upper Stort (*below*).



Aylesbury (Thame Catchment)

Development Pressures and Planning Issues

The Buckinghamshire Structure Plan makes provision for an additional 2000 houses around Aylesbury. The flood alleviation scheme in the town, which is nearing completion, was designed to deal with flooding taking account of the level of development set out in the Aylesbury Town Local Plan. However this excludes the additional 2000 houses. The additional housing is therefore likely to worsen the flooding situation unless appropriate mitigation methods are agreed.

Water Related Assets

- The River Thame runs close to the northern edge of Aylesbury and has an associated floodplain. A branch of the Grand Union Canal runs into the town.
- The Bedgrove Brook and Bearbrook to the east, and the Southcourt Brook to the south-west of the town, are of important amenity value to Aylesbury. Together with the Canal they offer opportunities for an integrated open space system.

Key Catchment Planning Issues

Source control measures to attenuate the increases in surface water run-off must be incorporated into any new development in order to avoid further flooding. Development in the floodplain should be resisted to retain the capacity, extent and natural flow routes of the floodplain.

Luton and Dunstable (Upper Lee Catchment)

Development Pressures and Planning Issues

Economic regeneration with an emphasis on the 'knowledge economy' is central to planning policies for this area. This includes redevelopment of urban sites, and the release of up to 70 hectares of 'greenfield' sites in the Green Belt to the north and north-east of Luton for development. Further housing is proposed at Dunstable.

A northern bypass is to be constructed for Luton.

The planned expansion of Luton Airport from a throughput of under 2 million to 5 million passengers per annum will require new airport buildings, improved access and parking arrangements, a new railway link, and other airport related development. Expansion could even lead to 20 million passengers per annum by the year 2015.

Water Related Assets

- The spring source of the River Lee flows from the chalk aquifer below Luton. River flows are erratic and water quality is of a fair to poor standard. The River currently lacks both fisheries or aquatic interest for these reasons.
- The area also has a number of other watercourses, such as the Houghton Brook, and some locally important sites for nature conservation associated with the water environment, for example Leagrave Marsh and the Fallowfields area.

The NRA has restored the village pond at Chalfont St. Giles. An impermeable lining was installed and both bankside and aquatic plants have been introduced. The pond had been empty for five years but now the village enjoys a new environmental asset.

Key Catchment Planning Issues

There is the threat of pollution to surface water and groundwater from the expansion of Luton Airport, the construction of the Luton (Northern) Bypass, and from the redevelopment of contaminated sites in Luton. The permeable chalk aquifer increases the threat of pollution to groundwater. The NRA guidelines set out in 'Policy and Practice for the Protection of Groundwater' should be followed.

The advantages of source control measures to reduce flow fluctuations in the River Lee need to be balanced against pollution risks to the chalk aquifer.

The level of future development may have implications for the availability of water resources, and an adverse impact on the environment through increased abstraction. Water demand management techniques should be employed for new development to minimise the impact on the water environment.

New development in the area should incorporate measures to assist in improving and enhancing the River Lee in Luton: improving water quality, reducing flow fluctuations, and physically improving the river corridor.



Stort Valley and Stansted Airport (Middle Lee Catchment)

Development Pressures and Planning Issues

A current permission for Stansted Airport allows for its expansion from a present throughput of 3 million passengers a year to 8 million, and with the possibility of further development to 15 million per year with special parliamentary approval.

Long-term large-scale housing development is planned at Bishops Stortford, Great Dunmow, Harlow and Sawbridgeworth. In addition, new settlements are being considered for Little Easton, and possibly Much Hadham.

Proposed industrial and housing development for airport support services may have an impact on the capacity of existing water resources and sewerage.

Water Related Assets

- The Stansted Area is located within the River Stort Valley. The River Stort flows over chalk in its upper reaches, and clay in the lower valley and is extremely important in terms of nature conservation.
- Within the catchment there are several SSSIs, four of these adjacent to the Stort Navigation of which the Spellbrook Flood Lagoon is owned by the NRA.
- Demand for recreation within the catchment is high, primarily due to the Stort Navigation.
- Water quality is of fair to good standard and supports a diverse range of flora and fauna including otters in the Lower Stort and Middle Lee.

Waterside development at Bishops Stortford.

Key Catchment Planning Issues

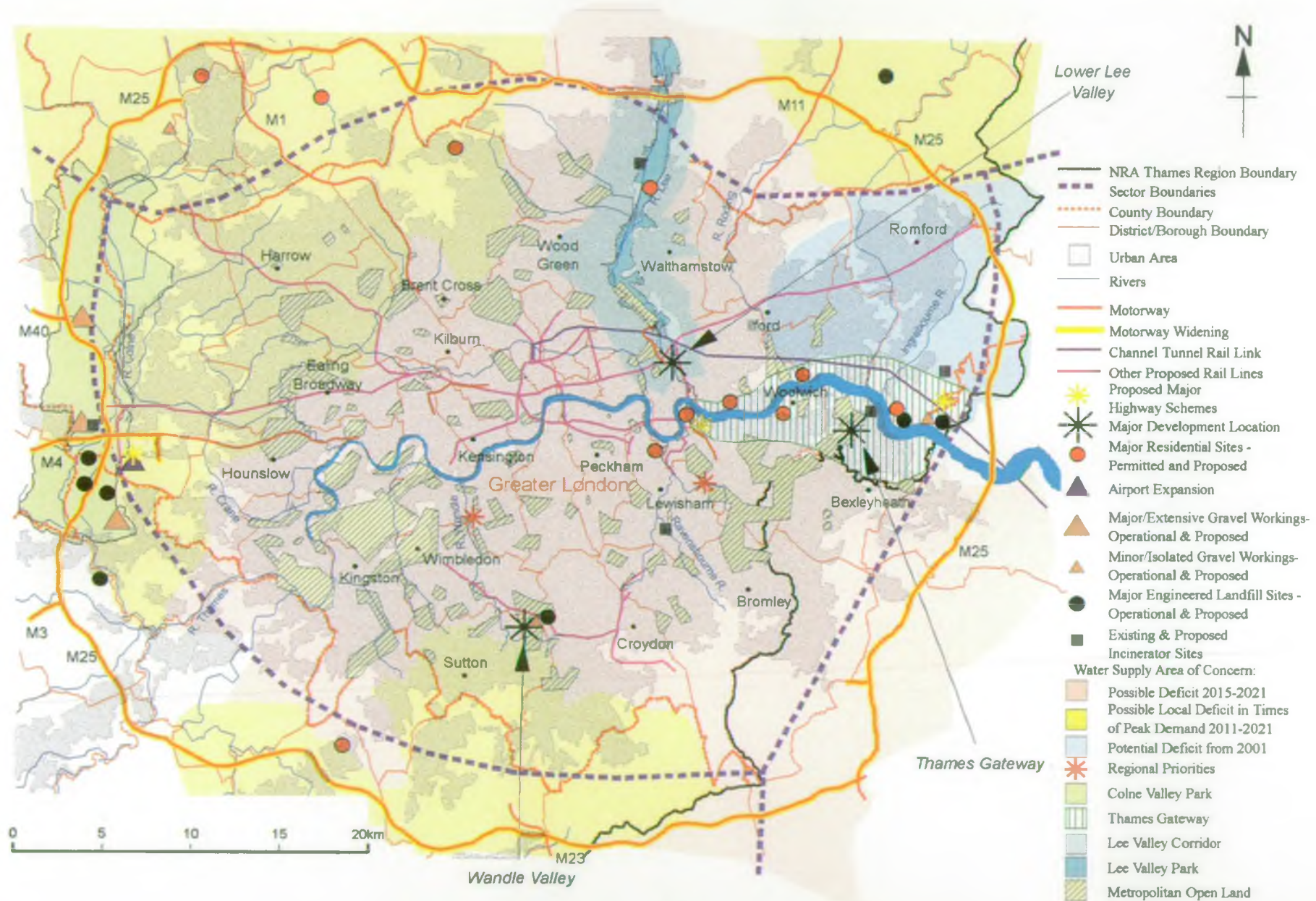
In order to protect surface water and groundwater, future development proposals in the Upper Stort Valley must incorporate suitable pollution prevention measures.

The rate of new development should also take account of the availability of water resources and associated infrastructure. Water demand management techniques should be considered.

New development in the Stort Valley should aim to minimise their impact on the landscape and enhance it where possible. There should also be no detrimental impact on the existing recreational resource of the Stort Valley.



10. London



London

The recently published draft Strategic Guidance for London Planning Authorities promotes London in its role as a world class city with an appropriate range of capital city functions such as finance, commerce, tourism and culture. Higher priority is to be given to the development of business, services and manufacturing.

The development of sites near key transport interchanges is to be promoted as part of a pattern of land use and transport which reduces the need to travel and supports walking, cycling and public transport.



London Boroughs have included policies for the Thames Path in their Development Plans and have used redevelopment as opportunities for its implementation.

As far as the water environment is concerned the draft strategy seeks to promote the River Thames in the context of its cultural and historic significance. Improved environmental quality is to be encouraged through measures to reduce pollution, ensure the better handling of waste and the encouragement of recycling.

Other recent studies have stressed the importance of the Thames as a national asset. The NRA's own 'Landscape Assessment and Design Guidelines for the Tidal Thames' (Consultation Draft) has recently been published as has the Department of the Environment's 'Thames Strategy'. Both provide advice on conserving and enhancing the Thames Tideway and provide advice in achieving quality in development proposals on the riverside.

Securing adequate and sustainable water resources for the capital will be a major challenge for the future. It will involve focusing on demand management, promoting water efficiency and when necessary, developing new water resource schemes. Growth in demand may lead to the need for a major new strategic water resource scheme in the region which may bring with it new environmental impacts and benefits.

Thames Gateway (Thames Catchment - Tideway and Estuary)

Development Pressures and Planning Issues

The Thames Gateway is the major development focus for South East England. Residential, commercial and leisure development opportunities are identified in the 'Thames Gateway Planning Framework'. The low perception of the Gateway area and its 'poor neighbour' industries needs to be reconciled with the Government's objective to create a high quality residential environment. Gateway development locations within the NRA Thames Region include the Royal Docks at Stratford, Greenwich Riverside, Woolwich and Thamesmead, Barking Reach and Havering Riverside. There is an opportunity to target development to areas of under-used and derelict land within existing industrial and urban areas, but many sites are contaminated by historic usage.

Major infrastructure projects are proposed including the channel tunnel rail link, several new river crossings, and major new roads and road improvements. Port expansion and port related development opportunities are proposed, especially for the transshipment and storage of aggregates and other construction materials.

There are also proposals for waste disposal to landfill and the development of waste to energy incinerators.

All development proposals in this area should take into account the predicted geophysical subsidence of South East England and forecasts of climatic change, and the consequent rises in sea level.



Working with the London Dockland Development Corporation the NRA has secured the construction of new flood defences as a benefit from the construction of the Limehouse Link Road.

Water Related Assets

- The River Thames has a unique historic and cultural importance which is of both national as well as local significance. Furthermore its tributaries, the Lower Lee, Roding, Ingrebourne and Beam have significant roles to play in the improvement in this area.
- The unique landscape character and appearance of the River should be maintained and enhanced. Inner reaches of the Gateway area are dominated by the docklands redevelopment, while outer reaches present a wild, open, remote and 'salty' environment. The River provides a major linear open space entering the Capital, and important views and vistas should be protected.
- The River Thames is designated as a site of Metropolitan Importance. Areas of high conservation value include sites of international significance for over wintering birds, and extensive areas of mud-flats, salt marshes and coastal grazing land are inhabited by many nationally scarce plants and invertebrates. 'Brownfield' sites provide important high-tide refuges for birds and seed banks for plant species which are disappearing from the upper parts of the foreshore.
- The foreshore is an important natural feature which adds to the character of the River. It is a valuable habitat for flora and fauna, and its disturbance can effect the flow of the river.
- Water quality of the River in the Gateway area is generally 'fair' to 'good'. Differences arise due mainly to the dissolved oxygen content of the water.
- There is an opportunity to utilise the River Thames as a more sustainable transport option, particularly for bulky goods such as aggregates and waste.
- The potential to realise the natural advantage of water-front locations in providing amenity, public access, open space and attractive riverside development.

Key Catchment Planning Issues

Opportunities and mechanisms for securing improvements to the water environment should be identified. The NRA should contribute to a wider strategic vision and work in partnership with local authorities and organisations such as English Nature. Many potentially conflicting objectives need reconciling including the need to 'bring the River to life', utilizing opportunities to develop waterfront locations, and increasing public access, open space and recreation, whilst retaining the value waterfront areas as a wildlife resource.

A strategic perspective and proactive approach to conservation needs to be developed. Development proposals should not harm areas of conservation importance and where possible should secure enhancements. Planting in waterside areas should comprise native instream, marginal or riparian species appropriate to the setting. 'Flagship' conservation projects should be developed. The increased pressures for recreational and commercial use of the River need to be balanced by measures to ensure precautions are taken to guard against pollution and disturbance of important wildlife sites.

The lack of green spaces in Central London should be supplemented by developing the River as a linear 'green' corridor. Where riverside developments are allowed, they should be well related to the river frontage and should not be separated from it, for example, by access or peripheral roads.

Development which encroaches on to the foreshore, or involves dredging of foreshore areas, should be resisted. Development should not adversely affect the use of the River for transport purposes or riverside industries.

The issues associated with new river crossings include scouring, foreshore encroachment, and environmental and visual impact. Tunnels can affect ground and surface waters, and the stability of tidal defences. The disposal of excavated material can also be a problem.

Flood defences maintained by the NRA front the north and south banks of the Estuary, and access is required for maintenance purposes. Development or dredging should not adversely affect the stability of these defences. Any alterations to the defences required by developments will have to be paid for by the developer and meet NRA requirements. Sea levels in the Estuary are assumed to be rising by 6 mm a year. The target standard of protection from a flood with a return period of 1 in a 1000 years, currently holds until the year 2030.

Source control measures should be incorporated where necessary within new development proposals to avoid increases in surface water run-off which can have a detrimental impact on flooding. Also, developments in low lying areas should avoid adversely affecting the stability of watercourse, drainage installations, or outflow arrangements.

There is a high risk of pollution to ground and surface water from the disturbance, enhancement and redevelopment of many contaminated sites. The guidelines set out in the NRA's 'Policy and Practice for the Protection of Groundwater' should be followed. In addition buffer zones should be maintained along watercourses to intercept run-off which may contain substances harmful to aquatic flora and fauna such as silt, oil and heavy metals.

The lead time for major infrastructure provision and the impact of increased abstraction on the water environment needs to be taken into account in planning the rate of proposed residential and commercial development. Measures to minimise the potential increase in water demand should be promoted.

Lower Lee Valley (Lower Lee Catchment)

Development Pressures and Planning Issue

This part of the catchment is under intense pressure from urbanisation and contains some environmentally and economically poor areas. The area is characterised by high density post war housing and piecemeal development. In order to address these problems, the area has been targeted for both European and Government funding projects.

There are a number of proposals for a wide range of infrastructure improvements, such as the M11 widening, Jubilee Line Extension, and Crossrail, which will have a significant impact.

The Thames Gateway project encompasses part of the area and promotes social, economic and environmental improvements.

Water Related Assets

- The area falls within the Lower Lee Catchment and is dominated by the River Lee and its associated flood relief channel (constructed in the 1970s to alleviate serious flooding in the area).
- The catchment is based predominantly on London Clay and water quality ranges from good to poor.
- There are a number of water dependant SSSIs, eg Walthamstow Marshes, and other sites of interest.
- The valley is a centre for informal recreation, with the Lee Navigation attracting a wide variety of users.

The Lee Valley has a rich industrial heritage. The House Mill, Bromley-by-Bow was built in 1776 and is believed to be the largest and most powerful tide mill in the country.

Key Catchment Planning Issues

The development that has taken place in the past has had an adverse impact on the water environment in a number of ways. Surface water run-off will have added to the flooding problem in the area, and therefore any new development (including the highway improvements in the area) should incorporate measures to attenuate surface water run-off. The poor water quality and availability of water resources is also a problem in the area because of past development pressures. Demand management techniques need to be promoted if future development is not to have a further detrimental impact through increased abstraction.

Opportunities should be identified where development/redevelopment could enhance and improve the landscape of the river corridor and the conservation value of surface waters.



The Wandle Valley (Wandle/Beverley/Hogsmill Catchment)

Development Pressures and Planning Issues

Mineral extraction in the area has to date been confined to the removal of alluvial gravels. However, permission was granted in 1985 for the extraction of the underlying sand and gravel deposits, and restoration to lakes. If this scheme is implemented the issue of lack of flood storage may arise, and the lake system may not be sufficient in length to adequately dilute the contaminants of the River Wandle. Thames Water Utilities Ltd has recently won an appeal to backfill a number of the gravel pits with domestic refuse entailing raising the existing land profile.

The Unitary Development Plan contains policies relating to the strategic need for flood storage, pollution prevention safeguards, and an integrated approach towards balancing future opportunities for nature conservation and recreation.

Water Related Assets

- The River Wandle catchment is predominantly urban, but the River provides a valuable green corridor within the built environment.
- The River Wandle links various sites of conservation interest such as Beddington Sewage Treatment Works, Wilderness Island Local Nature Reserve, and Watermeads.
- Much of the River Wandle has been identified as a Site of Metropolitan Importance partly due to the rich variety of aquatic plant life.
- Much of the area lies within the floodplain of the River Wandle.
- Water quality is only fair to poor. Local contamination of groundwater from past industrial activity is fairly widespread eg at Beddington.

Development proposals at Carshalton provide the opportunity both for clearing up contaminated land and for restoring the river to its natural state.

Key Catchment Planning Issues

There are a number of sites for redevelopment along the River Wandle providing opportunities for environmental enhancements and access to the river frontage.

The proposed gravel extraction and landfill operations will have a large impact, but opportunities should be identified for enhancing the River Wandle corridor. In particular, the proposals present an opportunity to create a large body of water for recreation in an area of London identified by the Sports Council as deficient in this respect. Informal access could also be improved.

The proposal for waste disposal is of concern both in terms of pollution and flooding. The guidelines set out in the NRA's 'Policy and Practice for the Protection of Groundwater' must be followed to try to protect the groundwater and surface water in the area from pollution. Any further encroachments into the floodplain should be resisted in order to retain the capacity, as far as possible, and allow the free flow of flood waters. Increases in surface water run-off caused by development should be contained by using source control measures so that the risk of flooding is not increased further.

The diversity of flora and fauna should be protected and enhanced where development provides the opportunity.



The following policy documents published by the NRA, may also be of interest.

1. National Documents

- Guidance Notes for Local Planning Authorities on the Methods of Protecting the Water Environment through Development Plans. January 1994.
- Policy and Practice for the Protection of Groundwater 1992.
- Contaminated Land and the Water Environment 1994.
- Water Nature's Precious Resource: An Environmentally Sustainable Water Resources Development Strategy for England and Wales. March 1994.
- Corporate Strategy 1995/6.
- Water Quality Strategy 1993.
- Water Resources Strategy 1993.
- Flood Defence Strategy 1993.
- Fisheries Strategy 1993.
- Conservation Strategy 1993.
- Navigation Strategy 1993.
- Recreation Strategy 1993.
- Research and Development Strategy 1993.
- NRA Water Quality Series 1992.

For further information please contact:

**National Rivers Authority
Rivers House
Waterside Drive
Aztec West
Almondsbury
Bristol BS12 4UD Tel: 01454 624400**

2. Regional Documents

- Future Water Resources in the Thames Region : A Strategy for Sustainable Management (1994). NRA, Reading.
- River Thames Recreation Strategy (1995). NRA, Reading.
- Thames Region Appendix for the Policy & Practice for the Protection of Groundwater, 1992.

Catchment Management Plans

- River Kennet. CMP Final Report.
- Upper Thames CMP Consultation Report.
- River Cherwell CMP Consultation Report.

For further information please contact:

NRA Thames Region - West Area
Isis House, Howbery Park, Wallingford
Oxon. OX10 8BD Tel: 01734 535000

- Blackwater River CMP Final Plan.
- The Wandle, Beverley Brook, Hogsmill CMP Consultation Report.

For further information please contact:

NRA Thames Region - South East Area
Riverside Works
Fordbridge Road, Sunbury-on-Thames
Middlesex. TW16 6AP Tel: 01932 789833

- Upper Lee CMP Final Plan.
- Middle Lee CMP Action Plan.
- Lower Lee CMP Consultation Report.

For further information please contact:

NRA Thames Region - North East Area
The Grange, 97 Crossbrook Street,
Waltham Cross, Herts. EN8 8HE
Tel: 01992 635566

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