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Mersey/Bollin Local Environment Agency Plan

Environmental Overview December 1999

ENVIRONMENT AGENCY



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Mersey/Bollin Local Environment Agency Plan Map 1



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This map illustrates the Local Agency Plan areas across the Cheshire Plain, bounded by grid references 70, 80, and 90 on both the horizontal and vertical axes. The map shows various towns and villages including Stretford, Urmston, Sale, Altrincham, Stockport, Knutsford, Wilmslow, Alderley Edge, Prestbury, Bollington, and Macclesfield. Shaded regions represent different Local Agency Plan areas. Blue lines indicate the courses of numerous rivers and streams, such as the River Mersey, River Weaver, River Dane, and River Goyt. A north arrow is located in the top right corner, and a scale bar indicates distances up to 1 kilometer.

Base Map

KEY

- Area boundary
 - Watercourse
 - - - Culverted watercourse
 - Canal
 - Built up area

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1.1 Introduction

This document contains environmental information relating to the Mersey/Bollin Local Environment Agency Plan (LEAP) area and will support the issues and actions put forward in the Mersey/Bollin Draft Action Plan. The information included here relates to the Environment Agency's responsibilities and details the current uses, resources and pressures of the area as we see them. The document is not a complete Environmental Assessment of the area.

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**Mersey/Bollin Local Environment Agency Plan
Map 2**



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1.2 Air Quality and Radioactive Substances

General

Air quality is an indicator of environmental quality. Air pollution can damage flora and fauna, buildings and have significant effects on soil and water. It can also cause serious problems for children the elderly and those with asthma, bronchitis and other respiratory diseases.

Air pollution may be as gas or particulate matter. Dispersion and dilution depend on climatic conditions. Its impact may be local, especially regarding particulate matter that will often settle on nearby land or water, or it may be global, for example affecting the ozone layer or the concentration of greenhouse gases such as carbon dioxide.

The Local Authorities have primary responsibility for local air quality.

The Role of the Agency

The Environment Agency has powers to regulate air quality principally by operating a system called Integrated Pollution Control (IPC) for certain industrial processes which stems from Part 1 of the Environmental Protection Act 1990 (EPA90). The processes regulated are the potentially most polluting industrial processes including large combustion plant, iron and steel making, the chemical industry, solvent recovery and incineration plants. Nationally there are approximately 2,500 of such licensed processes, of which there are 11 in the area covered by this LEAP.

For this LEAP there are 8 processes in Trafford MBC and 3 in Macclesfield BC. The distribution is as follows: 1 natural gas refining process, 4 petrochemical processes, 4 processes for the use of organic chemicals and 2 di-isocyanate processes. (See Map 2).

The objective of IPC is to develop an approach to pollution that considers releases to all media from industrial processes in the context of the affect on the environment as a whole. This is to ensure that where releases to the environment cannot be avoided, the release is to the media that offers the Best Practicable Environmental Option.

Under the IPC arrangements, the Agency places in the IPC public register the following:-

- applications for authorisations;
- representations from statutory consultees;
- authorisations including limits set on releases;
- monitoring information required by conditions of an authorisation;
- any enforcement action or prosecutions taken by the Agency.

The Agency also regulates landfill sites and in particular landfill gas which is a product resulting from chemical and biological breakdown at waste sites. This gas is principally a mixture of methane and carbon dioxide, both of which are greenhouse gases.

1.2 Air Quality and Radioactive Substances

The Environment Agency has wide powers, but will need to work closely with others if environmental improvements are to be achieved. The Agency will need to look at partnerships with national and local government, business, industry and environmental and conservation groups to maximise its influence in securing environmental improvements. This is particularly important with regard to local air quality, where the Agency is only one of a number of regulatory bodies.

The Role of other Organisations

The Department of the Environment Transport and Regions (DETR) enforces controls on vehicle manufacturers.

The Health and Safety Executive regulates the nuclear industry by issuing site licences and monitoring their operations.

The Local Authorities and the National Air Quality Strategy

Development Plans contain policies on the need to control air pollution.

District Councils environmental health departments regulate air pollution from a large number of industrial premises under Part 1 of the Environmental Protection Act 1990. These are premises with a lower potential to pollute than those regulated by the Agency. The processes are designated as Part B processes under the Act, but Local Authorities can only regulate releases to air, whereas processes controlled by the Agency are regulated for releases to all environmental media. District councils also have powers to deal with nuisances from a wide range of non-industrial activities, such as smells from domestic and agricultural premises, smoke from outdoor cable burning and noise pollution. **County Analysts** provide an analytical service for District Council Environmental Health Officers (EHOs).

Under Part 4 of the Environment Act 1995 the Government was required to publish a national strategy for air quality including:

- a framework of standards and objectives for the pollutants of most concern;
- a timetable for achieving objectives;
- the steps the Government is taking and the measures it expects others to take to see that objectives are met.

The strategy was published in March 1997 and wherever possible the Environment Agency works closely with the local authorities to help achieve the objectives of the National Air Quality strategy.

1.2 Air Quality and Radioactive Substances

The Environment Act 1995 also laid the foundations for a nationwide system of local air quality management, in which local authorities are obliged to review and assess the quality of air in their areas. And also to take action where air quality standards or objectives are breached or at risk of being breached. The standards and objectives are defined in the Air Quality Regulations 1997 and are to be achieved throughout the UK by 2005. The standards reflect advice from the European Union and World Health Organisation and take into account potential risks, costs and technical feasibility.

To ensure that the standards and objectives of the Air Quality Regulations are met it will be necessary for local authorities to carry out periodic reviews of the air quality. Where standards are not being met an Air Quality Management Area should be declared, and an action plan produced to improve air quality. This will require objective assessments together with appropriate monitoring and modelling studies. Upon request the Environment Agency will provide local authorities with details of the processes it regulates together with air emissions data from them, which can then be fed into modelling studies.

The Environment Agency will ensure that for the industrial processes it regulates with emissions to air, the IPC authorisations for new processes will have appropriate conditions for achieving the objective of compliance with air quality standards and for existing IPC authorised processes the conditions will be reviewed and varied as appropriate. However, the whole burden of compliance with an air quality standard will not be put onto industry where it is not the major source of the pollutant.

Local Perspective

There are six local authorities within this LEAP, the four main ones being Trafford MBC, Macclesfield BC, Manchester CC, Stockport MBC. These local authorities carry out real-time and non real-time air quality monitoring.

A summary of real-time air quality monitoring is as follows:

Table 1 Summary of Real-Time Air Quality Monitoring

Local Authority	Pollutant Monitored
Trafford	Oxides of Nitrogen, Sulphur Dioxide, Particulate.
Macclesfield	Oxides of Nitrogen, Sulphur Dioxide, Carbon Monoxide
Manchester	Oxides of Nitrogen, Sulphur Dioxide, Carbon Monoxide, Particulate, Ozone.
Stockport	Oxides of Nitrogen, Sulphur Dioxide, Carbon Monoxide, Particulate.

1.2 Air Quality and Radioactive Substances

Table 2 Summary of Non Real-Time Air Quality Monitoring Sites and Pollutants

Area	Smoke	SO₂	NO_x	Lead	Benzene	Particulate	Other
Trafford	11	11	11	8	-	-	1 acid rain 2 radiation
Macclesfield	3	3	9	-	-	-	-
Manchester	8	8	11	3	9	8	2 acid rain 3 radiation
Stockport	3	3	16	-	-	-	-

Table 3 Annual averages for locations in the area for sulphur dioxide (SO₂), smoke and nitrogen dioxide (NO₂) in air (micrograms per cubic metre):

LOCATION	1995/6		
	SO₂	Smoke	NO₂
Trafford			
Macclesfield	21	8	38
Manchester	23	13	23
Stockport			

Further information on air quality can be obtained from the local authorities.

Improving Air Quality

Air quality is another issue that knows no boundaries. Its freedom to travel means that problems can spread away from points of origin, although specific problem areas can be created. In a local planning document it is possible to address specific points of origin and problem areas, but it is not possible to address problems coming in from outside the area. On a local scale responsibility for air quality is split between the Agency and Local Authorities. The Agency is responsible for the regulation of major industries, whilst local authorities regulate minor industries, control domestic smoke, evaluate local air quality and produce local air quality management plans. As part of its overall aim of contributing to sustainable development, the Agency is including addressing climate change in its work. The Agency has set this as one of the key themes in its Environmental Strategy that includes the following objectives:

- help the government deliver its Air Quality Strategy;
- ensure emissions from the major industrial processes to the atmosphere are reduced;
- ensure specific emissions of sulphur dioxide and oxides of nitrogen, which contribute to acid rain are reduced;
- discourage the use of solvents in industry, which contribute to the production of ozone, the major photochemical pollutant; and
- set an example in reducing emissions from vehicles by reducing our own mileage and increasing the use of public transport.

1.2 Air Quality and Radioactive Substances

Parts of the Agency's existing work and the proposals contained in this plan will help achieve some of these objectives.

Air quality, in a large part of the area covered by this LEAP, is being investigated by the Greater Manchester Air Quality Management Steering Group. This group is made up of representatives of the local authorities within the Association of Greater Manchester Authorities. The Agency has an input to the group and supplies information on processes that we regulate. The Atmospheric Research and Information Centre, based at Manchester University, is providing information and interpretation on air quality to the group. In large part, air quality issues within this LEAP area will be addressed by the steering group and therefore, we are not raising any specific issues in this LEAP. We support the work of the group and will continue to provide any information we can.

Radioactive Substances

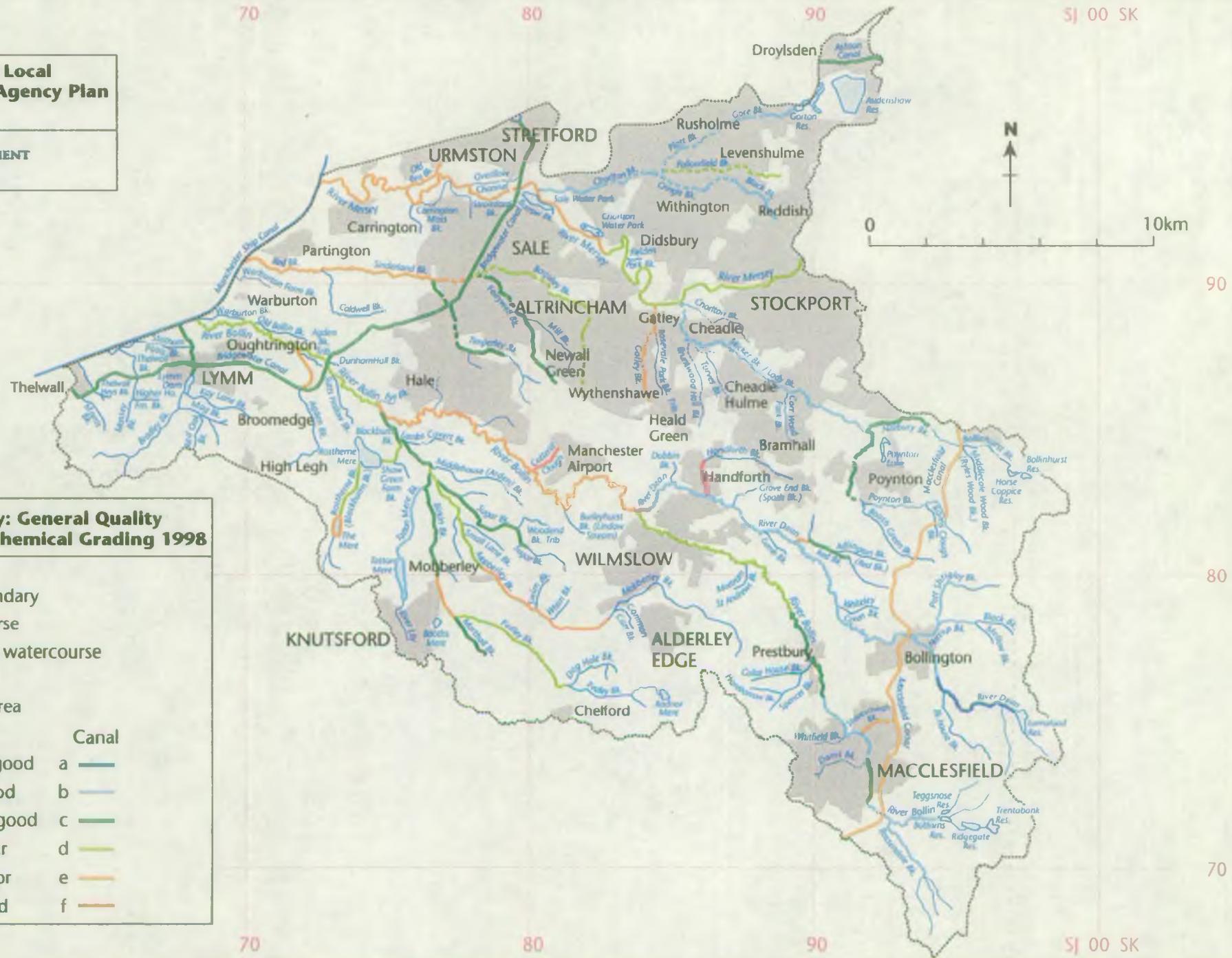
The Environment Agency has responsibility for regulating the keeping and use of radioactive material and the accumulation and disposal of radioactive waste under the Radioactive Substances Act 1993.

There are approximately 80 registrations for the keeping and use of radioactive materials in the area and there are 11 authorisations for the accumulation and/or disposal of radioactive waste. The radiological impact of these disposals, which are mainly from hospitals, is negligible.

Mersey/Bollin Local Environment Agency Plan Map 3



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Mersey/Bollin Local Environment Agency Plan
Map 4



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Water Quality: General Quality Assessment Biological Grading 1995

KEY

- Area boundary
- Watercourse
- - - Culverted watercourse
- Canal
- Built up area

River

- | | | |
|---------|---|-------------|
| ----- | A | Very good |
| - - - - | B | Good |
| ----- | C | Fairly good |
| ----- | D | Fair |
| ----- | E | Poor |
| ----- | F | Bad |

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The Catchment Area

1.3 Water Quality

The Environment Agency has duties under the Water Resources Act, 1991 and some European Commission (EC) Directives to monitor the water quality of controlled waters. Controlled waters include rivers, streams, lakes, ditches, groundwaters, estuaries and coastal waters. Comprehensive chemical and biological sampling programmes achieve these obligations.

Water Quality information is available on the Public Register, at the Environment Agency offices, and can be obtained by contacting the Customer Service Department at the Birchwood Office.

Water quality is subject to targets set by the Agency as River Quality Objectives (RQOs) and by the EC, as Directives. Failures to achieve these targets are detailed in the following maps. In addition, the Agency's General Quality Assessment (GQA) classification scheme enables periodic assessments of the water quality to be made.

General Quality Assessment

Map 3 indicates the 1998 chemical grades and **Map 4** the 1995 biological grades for the Mersey Bollin. The Agency's GQA scheme is used to make periodic assessments of water quality in order to report trends, both over time and between different rivers in England and Wales. Different aspects of water quality are referred to as 'windows'. Currently, the scheme reports using the chemical and biological windows, the nutrient and aesthetics windows are still in development.

Chemical Window - the GQA grades shown on **Map 3** indicate a variation in the chemical quality of the rivers in the area. 68% of the classified stretches are classified as fair or better, with only 1.5% classified as bad quality. It can be seen that to some extent the changes in water quality relate to centres of population.

Biological Window - aquatic invertebrates sampled routinely from all classified rivers provide a basis for the biological GQA grades as shown in the following table. Like the chemical GQA grades, this is a six-tier system, however, the two are not directly comparable. Biological classification is capable of detecting toxic and intermittent pollution, which can be missed by chemical monitoring, and also of highlighting habitat degradation.

1.3 Water Quality

Table 4. GQA Scheme for Biology

Table 4

Grade	Outline Description
a – Very Good	Biology similar to that expected for an unpolluted river of this size, type and location. High diversity of taxa, usually with several species in each.
b - Good	Biology falls a little short of that expected for unpolluted rivers. Small reduction in the number of taxa that are sensitive to pollution. Moderate increase in individual species in pollution tolerant taxa.
c – Fairly Good	Biology worse than expected for unpolluted rivers. Many sensitive taxa absent, or number of individuals reduced. Marked rise in numbers of individuals in taxa that tolerates pollution.
d - Fair	Sensitive taxa scarce and contain only small numbers of individuals. A range of pollution tolerant taxa present, some with high numbers of individuals.
e - Poor	Biology restricted to pollution tolerant species with some taxa dominant. Sensitive taxa rare or absent.
f - Bad	Biology limited to a small number of very tolerant taxa such as worms, midge larvae, leeches and water hoglouse, some may be present in very high numbers. In the worst case, there may be no life present.

River Quality Objectives

The Agency has strategic targets known as River Quality Objectives (RQOs) which provide a basis for water quality management decisions. The first set of standards to be developed, in the River Ecosystem (RE) scheme, relates to the chemical quality requirements for different aquatic ecosystems. Details of the scheme and the standards are given in Appendix 4 along with the proposed RQOs for the rivers and canals in the Mersey Bollin area.

For the classified watercourses of the Mersey and Bollin short term and long term RE RQOs have been proposed. Short term objectives must be achievable within a ten year horizon of committed investment or by the actions of the Agency or others. Long term objectives have also been proposed which reflect the achievable aspirations for the water quality. Achievement of these objectives may take more than ten years and require currently uncommitted expenditure.

The Environment Agency and its predecessor aim to reduce pollution to achieve the River Quality Objectives and improve the aquatic ecosystem.

Compliance with the short-term River Ecosystems RQOs is shown in Map 5. 16.8% of classified length of the river in the Mersey Bollin area fail to achieve the short-term objective. In a further 1.3% of stretches the attainable short-term quality falls below the lowest RE class such that no short-term objective can be set.

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**Mersey/Bollin Local Environment Agency Plan
Map 5**



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Water Quality: Compliance with Proposed Short Term River Ecosystem RQOs (1998)

KEY

----- Area boundary

----- Built up area

River

RE () Objective (date)

Compliant

Marginal failure

Significant failure

Unclassified

Reach boundary

NO No objective proposed

Canal

RE ()

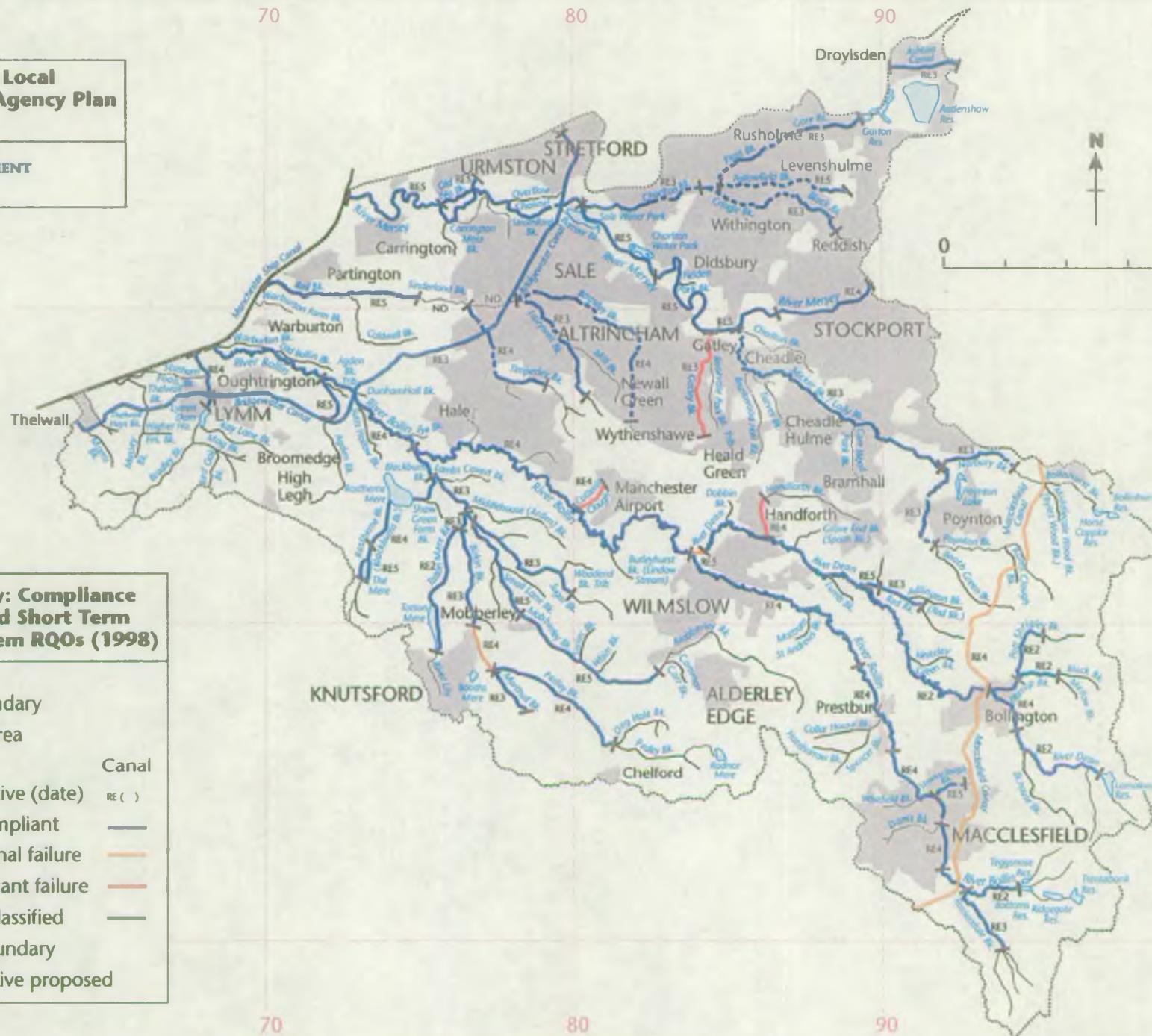
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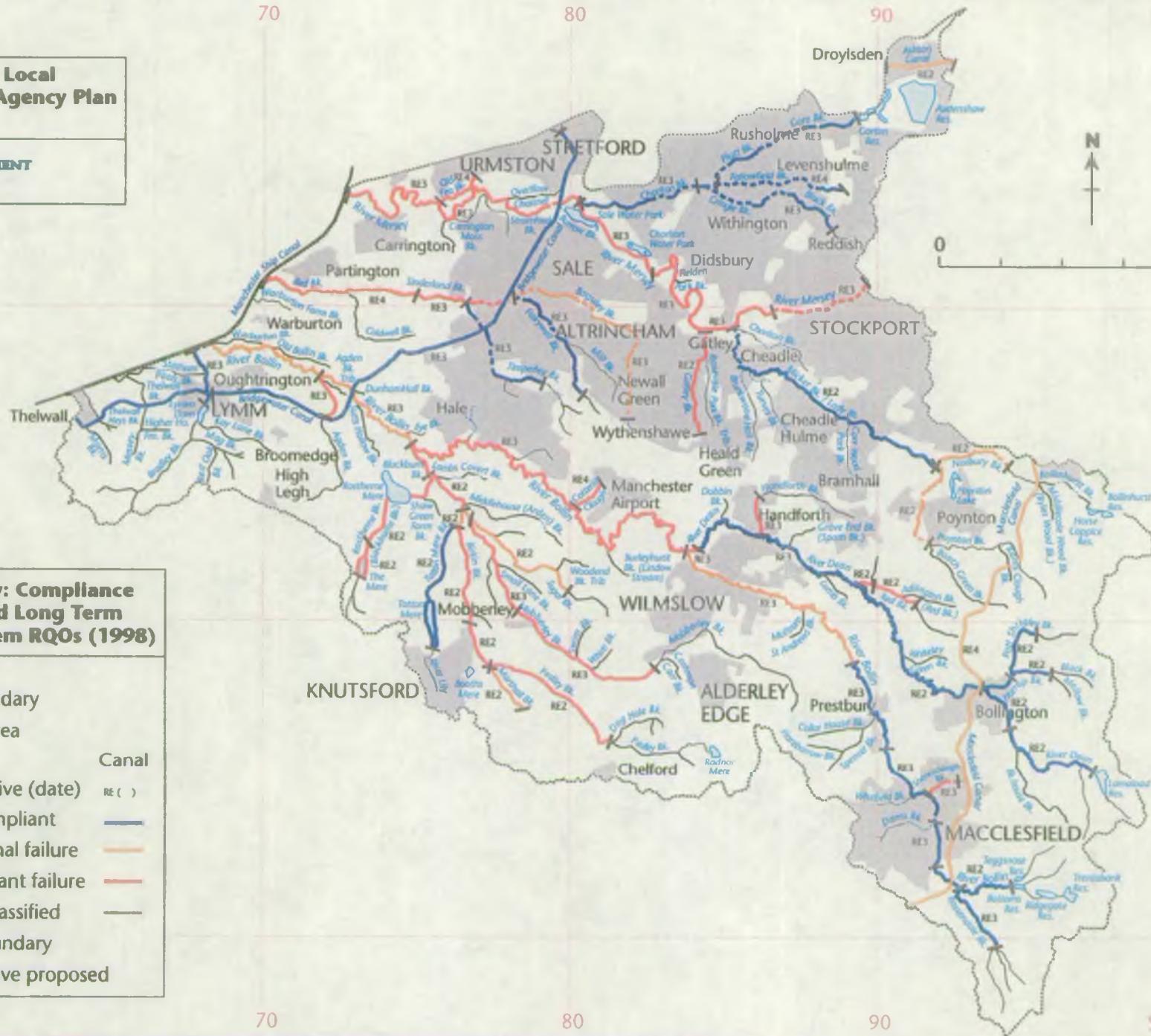
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**Mersey/Bollin Local Environment Agency Plan
Map 6**



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**Water Quality: Compliance
with Proposed Long Term
River Ecosystem RQOs (1998)**

KEY	
-----	Area boundary
■■■■■	Built up area
River	Canal
RE ()	Objective (date)
-----	Compliant
-----	Marginal failure
-----	Significant failure
-----	Unclassified
—	Reach boundary
NO	No objective proposed

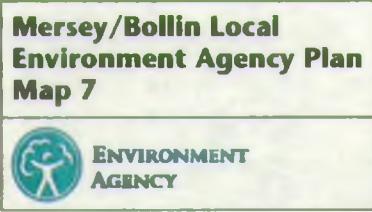
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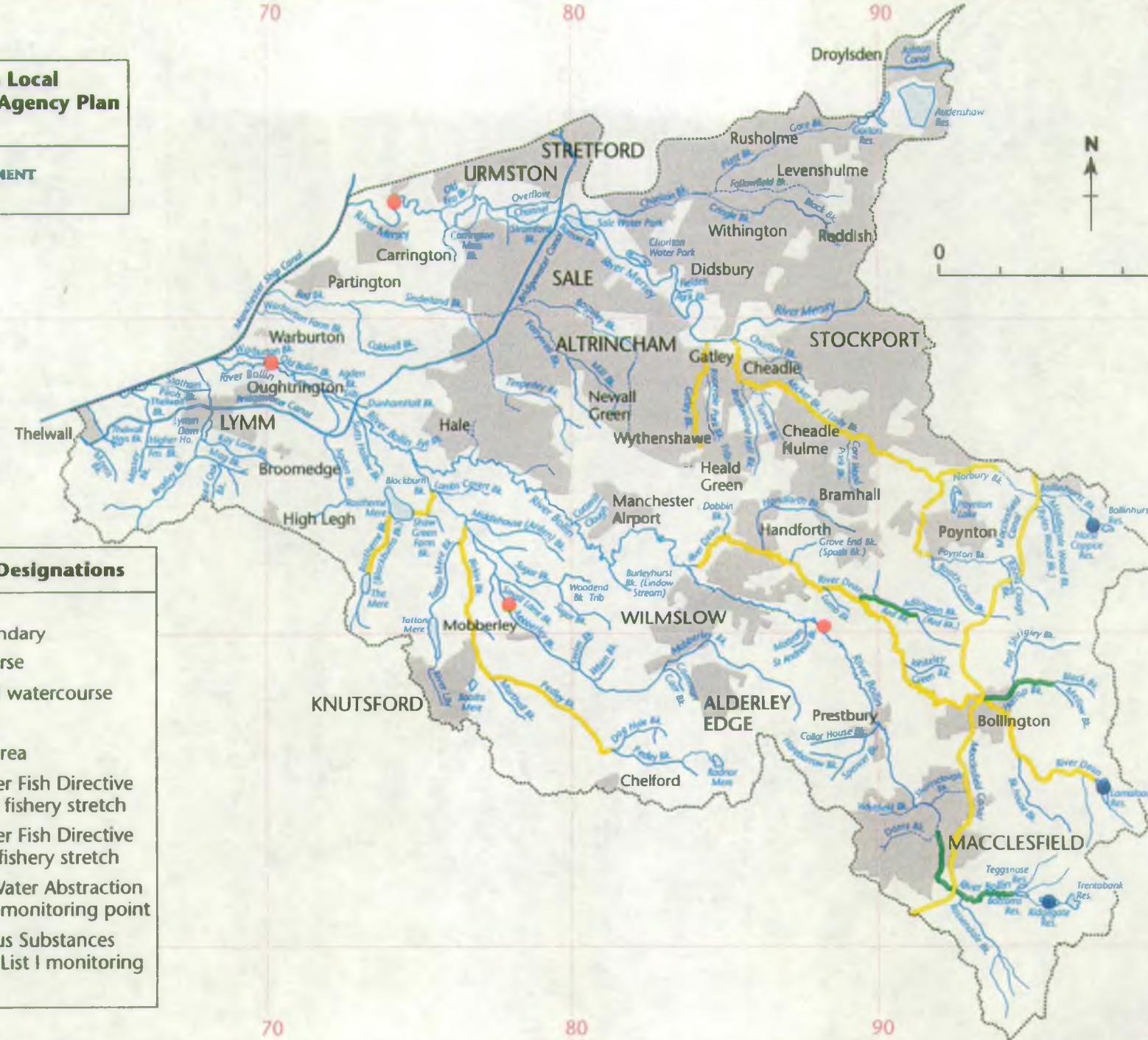
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EC Directive Designations

KEY

- Area boundary
- Watercourse
- Culverted watercourse
- Canal
- Built up area
- Freshwater Fish Directive Salmonid fishery stretch
- Freshwater Fish Directive Cyprinid fishery stretch
- Surface Water Abstraction Directive monitoring point
- Dangerous Substances Directive List I monitoring point



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1.3 Water Quality

Map 6 shows compliance with the proposed long-term River Ecosystem RQOs. 38.5% of stretches are currently complying with the long term objective, 25% marginally failing and 36.5% significantly failing.

EC Directives

There are several environmental Directives issued by the European Commission, designed to preserve, protect or improve the quality of the environment, which have water quality implications within the Mersey Bollin area. The Directives that deal with different uses and risks to the water environment contain standards for water quality which must not be exceeded. See **Map 7**.

Directive on Urban Waste Water Treatment (91\271\EEC)

The Directive specifies requirements for the collection and treatment of industrial and domestic wastewater at sewage treatment works. It also covers treatment of wastewater from certain sectors of industry prior to direct discharge to a watercourse.

The directive specifies secondary treatment for all treatment facilities serving population equivalents greater than 2000 by the year 2005. Interpretation of the directive in the UK means that nearly all relevant discharges within the Mersey Bollin will already comply with all the requirements. In addition waters that receive a WwTW discharge greater than 10,000 population equivalent may be designated as 'sensitive' under the directive if they are eutrophic, are used for public supply and contain more than 50 mg/l nitrate. There are presently no designated 'sensitive areas' in Mersey Bollin catchments but future designations are under review.

The requirement for collecting systems (sewerage networks) is that they be designed, constructed and maintained in accordance with best technical knowledge not entailing excessive cost. This is with particular regard to the limitation of pollution in the receiving water due to storm (and emergency) overflows. This presents a very significant objective to be met.

Directive on Dangerous Substances (76\464\EEC)

This Directive provides a framework for measures to control water pollution from discharges of certain dangerous substances, sub-divided under List I and List II. Member States of the EU are required to take steps to eliminate pollution by List I substances and reduce pollution by List II substances.

UK Environmental Quality Standards (EQSs) have been established for concentrations of these substances in watercourses. Limits for discharges containing the substances have been set to ensure compliance with the EQS in the watercourse.

1.3 Water Quality

Freshwater Fish Directive (78\659\EEC)

The Directive sets Environmental Quality Standards (EQSs) for stretches of freshwater designated as suitable for either salmonids (salmon and trout species) or cyprinids (coarse fish species). It is concerned with ensuring that the water quality in designated stretches of water is suitable for supporting fisheries.

In addition for each fishery type there are two sets of standards. The imperative (I) standard specifies what must be achieved, and guideline (G) standards which should be met.

Fifteen stretches of water are designated; twelve of them are cyprinid.

Surface Water Abstraction Directive (75\440\EEC)

This Directive ensures that surface water used for drinking water meets certain standards and is given adequate treatment before entering public supplies. The Directive sets out imperative standards that must be achieved, and guideline standards that Member States should aim to achieve. Surface water are divided into three categories A1, A2, and A3 which reflect the method of treatment received to meet the required quality for potable water supply.

There are three monitoring sites in the area on the main reservoirs shown on the map.

Water Resources

Water is one of our most valuable resources. Normally, England and Wales have sufficient water to meet demands. However, resources are limited and they are not always in the right place at the right time. Demand for water is increasing; there is growing competition for the available resources. The Water Resources function of the Environment Agency is responsible for ensuring that water resources are managed effectively and for the benefit of everyone. We fulfil this role principally through a system of abstraction licensing. As a requirement of the Water Resources Act 1991, almost anyone who wants to take water from a surface source (e.g. river, stream or canal) or underground strata must obtain a licence to do so from the Agency.

The Environment Agency needs to ensure that water resources are safeguarded and that abstractions do not damage the environment. Without licences, persistent over abstraction could lead to shortages in water supply, increased river pollution by reducing dilution of pollutants, damage to fisheries and wildlife habitats and ultimately to the loss of rivers for our recreation and enjoyment. By licensing, we can control the level of abstraction to protect both water supplies and the environment.

Water is an essential resource used by agriculture, industry and for potable supply. Agricultural demand is generally met through direct abstractions from rivers, streams and groundwater. In addition to these options industry also uses water from the public water supply system to meet demand. Customers using water and losses through leakage from the distribution network generate this demand.

1.3 Water Quality

Historically, water has been a cheap commodity for industry and an unlimited and domestic consumers view uninterrupted supply as a right. These factors, together with the domestic charging scheme, have contributed to a culture of less than efficient usage of water and little recognition of its true value. Water conservation and demand management are topics which have been receiving increasing attention since the water resources problems during 1988-92 and the well-publicised problems of 1995-96. Progress has been made towards understanding the environmental effects of wastage of water. There are many ways of using water more carefully and a large number of organisations and individuals have a role to play. For example, within agriculture the availability of water has not been an issue within the North West Region until the experience of the drought of 1995/96. By introducing waste minimisation, demand management measures and effective agricultural use, the need for water can be reduced.

The level of leakage losses from the distribution and trunk mains systems and customer supply pipes varies across the North West Region, depending on the length of pipe, number of connections and the age of the system. The infrastructure that supplies Greater Manchester is, in places, over 100 years old and has levels of leakage higher than the national average.

Across the Region North West Water Ltd over the last three years (1995 – 1998) have reduced leakage by nearly 300 million litres per day and are committed to reducing leakage by a further 64 million litres per day (Ml/d) during 1998/99. North West Water Ltd has achieved a 40 % reduction in total leakage from 948 Ml/d in 1992/3 to 579 Ml/d in 1997/8.

The company is on target to achieve the mandatory regional total leakage target of 515 Ml/d by March 1999, as set by the Director-General of the Office of Water Services (OFWAT).

North West Water Ltd are reducing leakage by a programme of mains pressure reduction and control, leakage detection and repair, mains refurbishment, improved times to repair leaks, increased monitoring and a public awareness campaign including a free telephone 'Leakline' for reporting leaks (0800 330033).

All new licence applications for abstraction licences and variations of existing licences require the applicant to justify the quantity applied for and to detail what water minimisation schemes and measures they intend to put into place. Contained within the Agency's Environmental Strategy are a number of points relating to the promotion of low-water usage appliances, encouraging more efficient use of water and supporting the metering of water which will be the approach the Agency will take in relation to the management of water resources. This will provide further opportunities to promote waste minimisation through more efficient use of water.

The Agency's National Water Demand Management Centre, based in Worthing, publishes both internal and external guidance, provides information/advice and inputs to policy in relation to water conservation, efficiency and demand management.

1.4 Effluent Disposal

General

The disposal of domestic and industrial effluents is an important use of the watercourses within the Mersey Bollin area. Most is collected via the sewerage network for treatment at North West Water Ltd (NWW) Wastewater Treatment Works (WwTW). There are significant WwTW at Stockport, Sale and Macclesfield with smaller works serving the outlying areas. See Map 8.

In addition to the continuous effluents, intermittent wastewater discharges are made from the sewerage network at storm overflows, during periods of heavy rain and at emergency overflows at pumping stations in the event of power or mechanical failure. There are over 220 sewer overflows in the Mersey Bollin area.

Houses and businesses remote from the sewerage network may have a small sewage treatment plant that discharges to a watercourse or a septic tank with a soak-away to ground.

Permitted discharges of effluent are regulated by the Agency via either a discharge consent issued under the Water Resources Act 1991, or as part of an Integrated Pollution Control Authorisation issued under the Environmental Protection Act 1990. When determining applications to discharge the Agency sets conditions appropriate for protecting other uses of the receiving water.

In some cases the consents set by predecessor bodies and inherited by the Agency do not adequately protect the aquatic environment. The tightening of such consents is addressed where possible, however, there are often significant financial, technological or other constraints. Capital expenditure by the Water Services companies for example is constrained by the Asset Management Plan. (Appendix 5).

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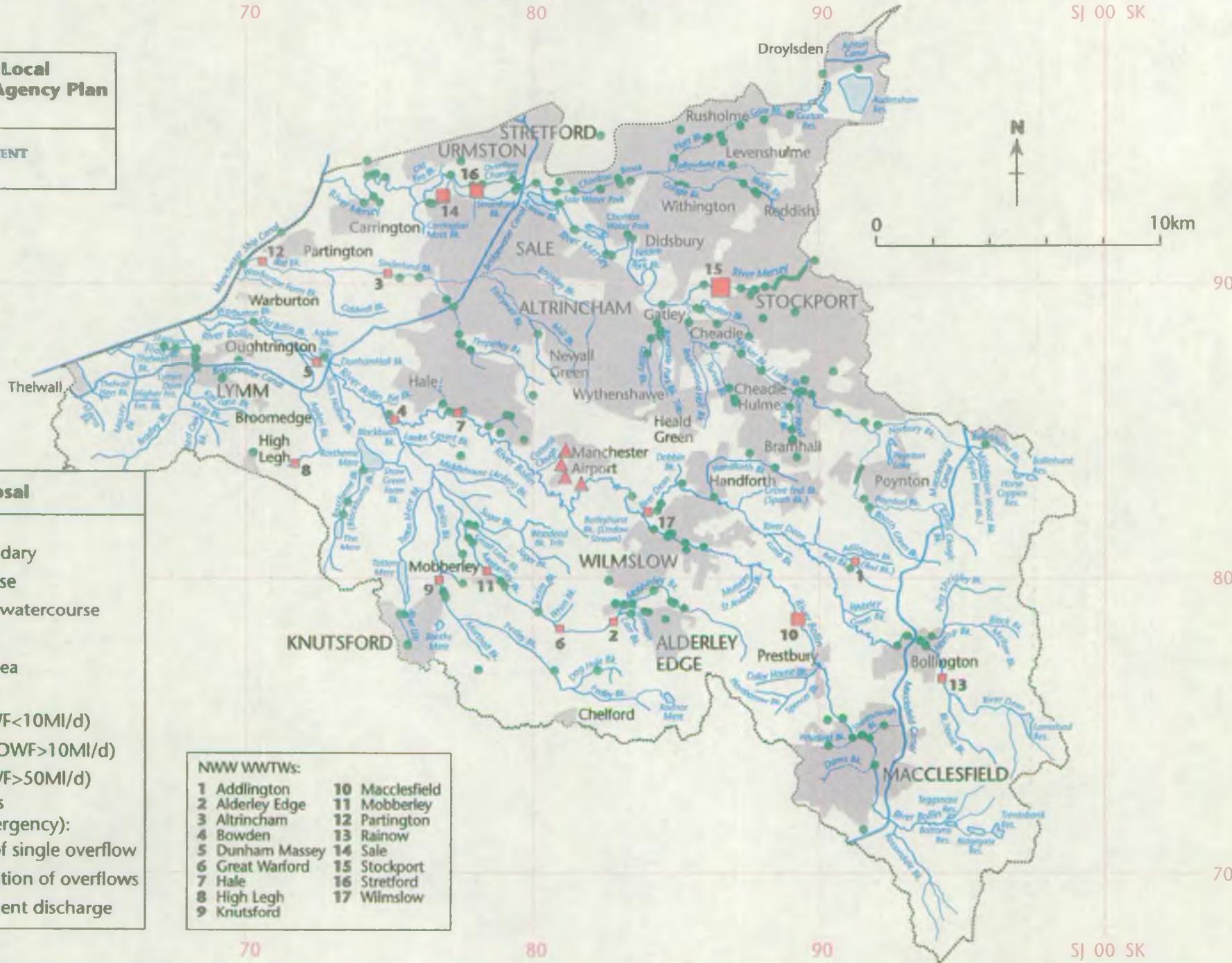
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**Mersey/Bollin Local Environment Agency Plan
Map 8**



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Mersey/Bollin Local Environment Agency Plan Map 10



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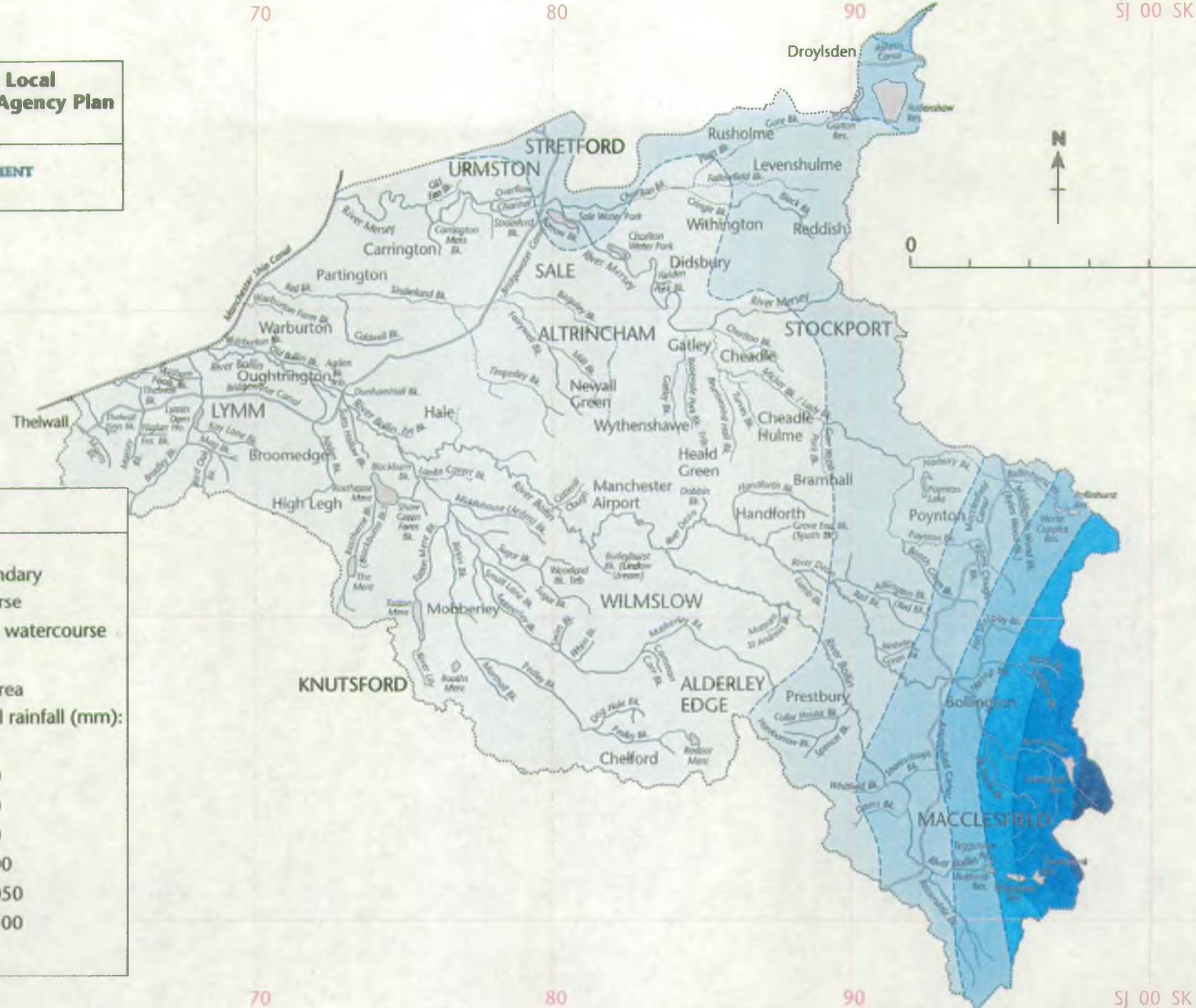
Rainfall

KEY

- Area boundary
- Watercourse
- Culverted watercourse
- Canal
- Built up area

Average annual rainfall (mm):

- <800
- 800 - 850
- 850 - 900
- 900 - 950
- 950 - 1000
- 1000 - 1050
- 1050 - 1100
- >1100



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1.5 Hydrology

The average annual rainfall for the plan area, as shown on Map 10, varies from 812mm in the west to 1100mm in the foothills of the Peak District. This variation is caused by the changes in topography, with minor variations due to the effects of local urbanisation. Rainfall is measured in the area by a network of raingauges, these gauges form part of the Agency's national rainfall measurement network.

The pattern of rainfall throughout the year is shown in Figure 1 for the raingauges at Sale (NGR SJ765927) and Lamaload Reservoir (NGR SJ968755). The highest and lowest monthly recorded totals are given to demonstrate the range of these monthly totals.

Figure 1. Seasonal Variation in Rainfall

Sale (Carrington Lane) Raingauge, NGR SJ765927												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean*	73	54	61	53	60	65	65	77	77	83	82	82
Max+	128.7	150.5	145.5	94.6	120.9	133.7	181.2	116.3	170.6	159.5	140.7	176
Min+	7	3.8	7.9	3.8	4.6	19.7	12.8	6.4	14.6	23.7	35.4	22.7

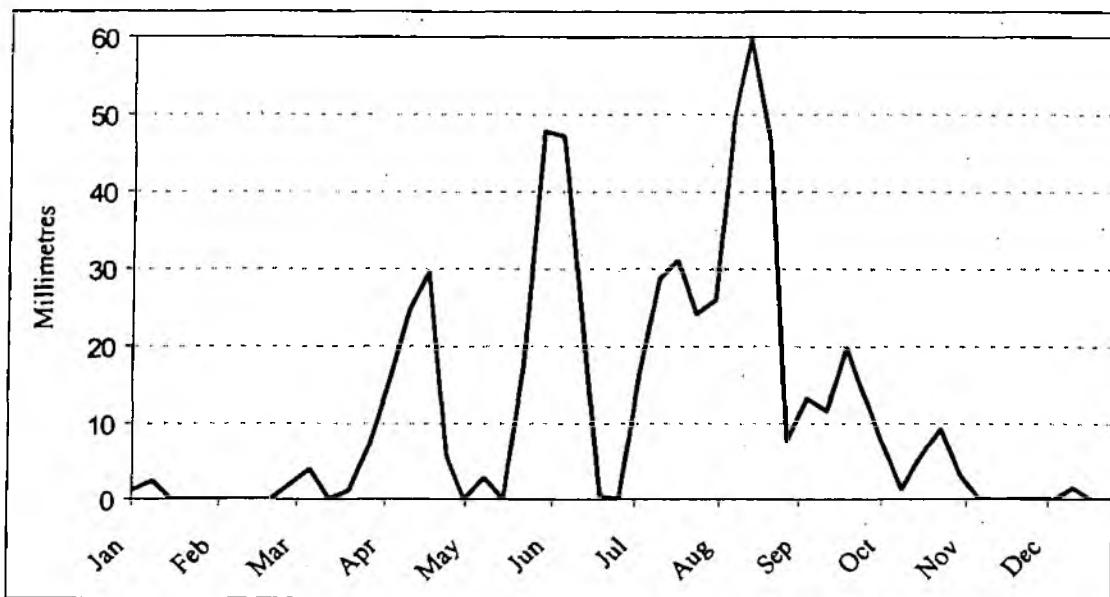
Lamaload Reservoir Raingauge, NGR SJ968755												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean*	100	67	88	75	75	85	85	102	97	100	104	109
Max+	194.7	211.4	191.3	140.3	161.6	191.6	176.5	158.0	224.3	173.4	191.9	234.3
Min+	7.4	7	16.8	5.4	13.7	22.5	30.8	14.3	12.8	30.2	53.4	24.9

- 1961-90 Long Term Average+
- Maximum and Minimum Recorded Monthly Totals 1961-95

The effect of this rainfall varies with its intensity and the state of the catchment. Soil moisture deficit (SMD) is a measure of the "dryness" of the soil, and is expressed as the amount of rain (mm) required to bring the soil to a saturated state. Figure 2 shows the typical seasonal changes in SMD in the area brought about by weather conditions and evapotranspiration by plants. The SMD is generally high in summer and low in winter. Under the saturated winter conditions water drains from the soil and recharges the groundwater, raising the water table.

1.5 Hydrology

Figure 2 Soil Moisture Deficit 1997

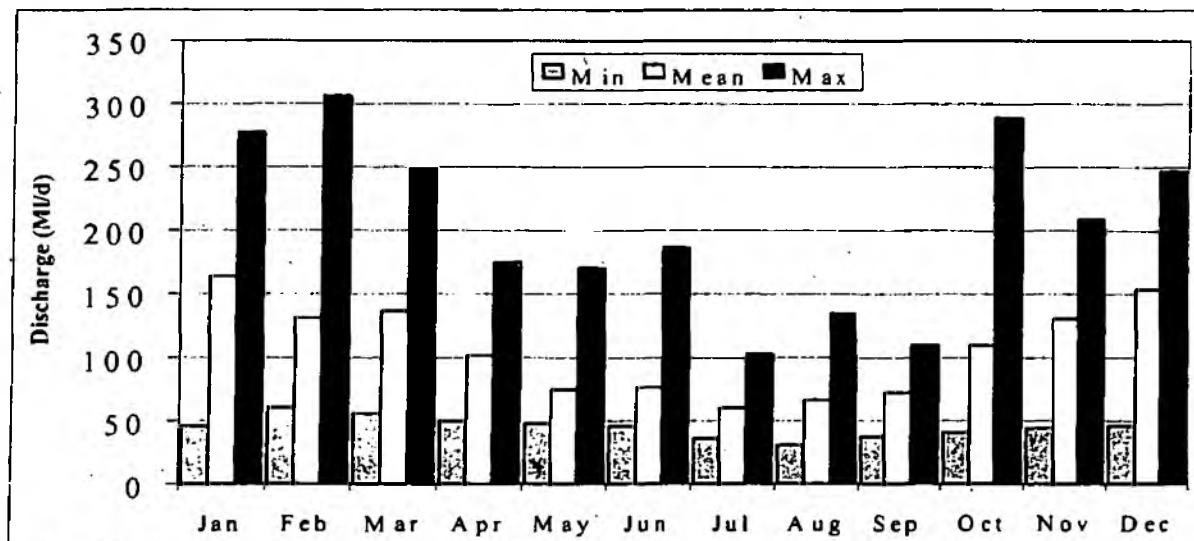


Rainfall, SMD and groundwater levels contribute to the natural variability of flow in a river.

The flow in the Bollin and Mersey catchments is measured at several points as shown on Map 9. The flow upstream of the Dean and Bollin confluence is measured at Wilmslow gauging station (NGR SJ 8497 8149) which has a catchment area of 72.5km². Flow on the Mersey is measured at Ashton Weir gauging station (NGR 7723 9356) which has a catchment area of 660 km², though this includes upstream tributaries not within this LEAP area.

Modification due to abstraction and discharges into the catchments result in measured average flows (for 1976-1998) of 105 Ml/d at Wilmslow and 1032 Ml/d at Ashton Weir. The flow in the rivers vary on a seasonal basis as shown in Figures 3 and 4.

Figure 3 Monthly Mean Flow (Ml/d) River Bollin at Wilmslow



1976 - 1999 Long Term Average, Maximum and Minimum Monthly Averages

60

70

80

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SJ 00 SK

**Mersey/Bollin Local Environment Agency Plan
Map 9**



90

LYMM

80

KNUTSFORD

70

Hydrometric Network

KEY

- Area boundary
- Watercourse
- Culverted watercourse
- Canal
- Built up area
- River level monitoring location
- River flow monitoring location
- Event raingauges
- Storage raingauges

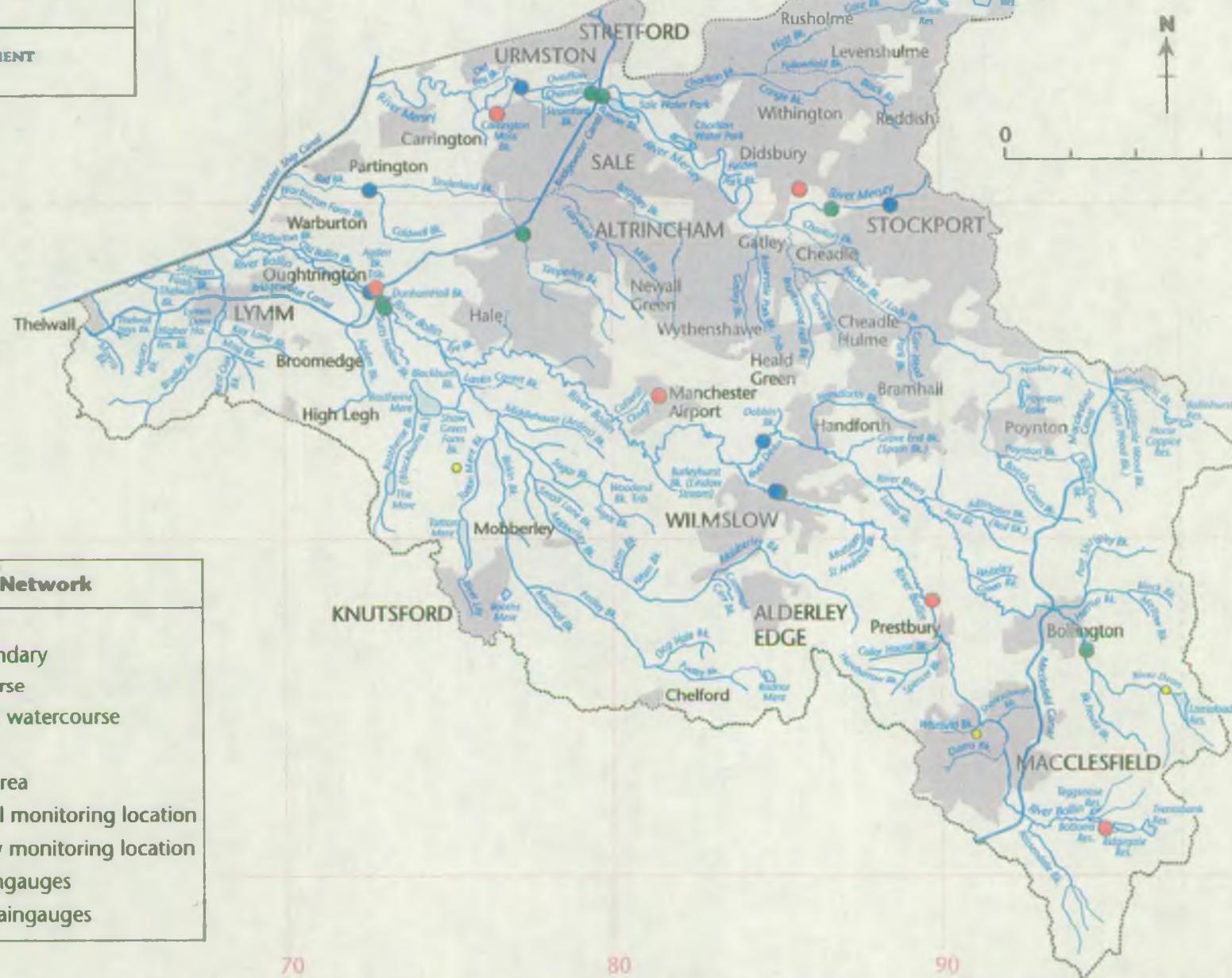
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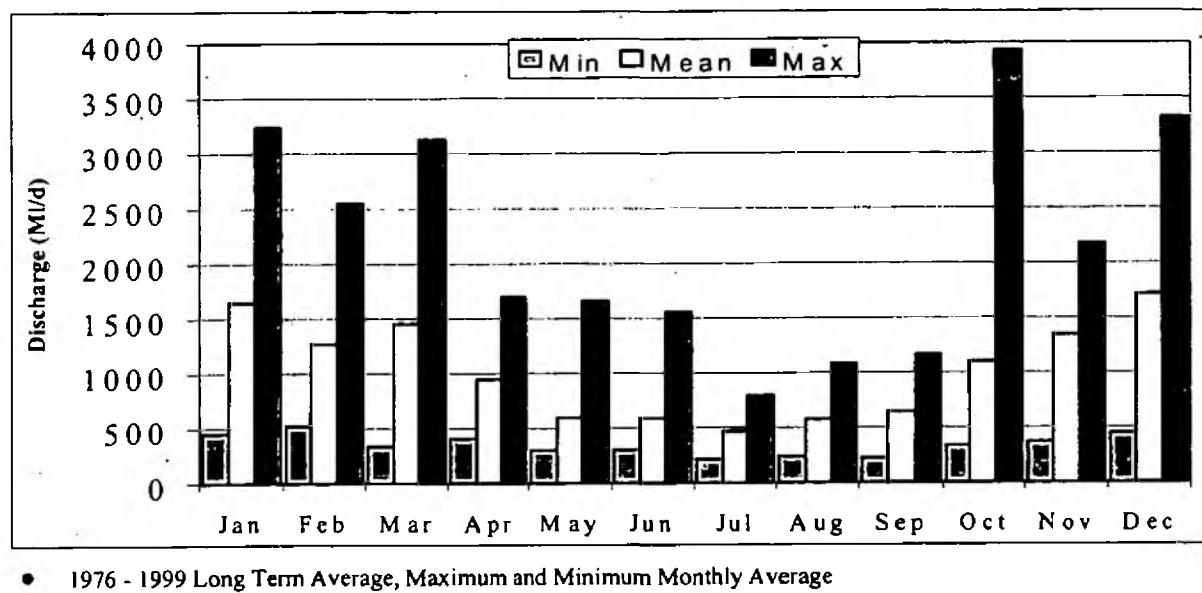
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1.5 Hydrology

Figure 4 Monthly Mean Flow (Ml/d) River Mersey at Ashton Weir



• 1976 - 1999 Long Term Average, Maximum and Minimum Monthly Average

1.6 Geology and Hydrogeology

The headwaters of the River Dean and Bollin rise on the higher ground formed by relatively hard, erosion resistant grits and interbedded shales of the Carboniferous Millstone Grit Series. Coal Measures strata, also of Carboniferous age, are present to the north; these are predominantly shales with some thin sandstones and coal seams. The Carboniferous sandstones act as individual 'minor aquifers' separated by the lower permeability shales/mudstones; they are frequently exploited as private water supplies to properties remote from the public supply mains water system.

To the west occurs the Triassic Sherwood Sandstone, forming an arc swinging north westwards, and extending all the way to Merseyside. See Map 12b. These rocks are classed 'major aquifer' and are exploited for public water supply and industrial use within the catchment. They are overlain in the south and west by very thick deposits of younger Triassic mudrocks; the Mercia Mudstones, which contain very little groundwater and as such are classed as 'non-aquifer'.

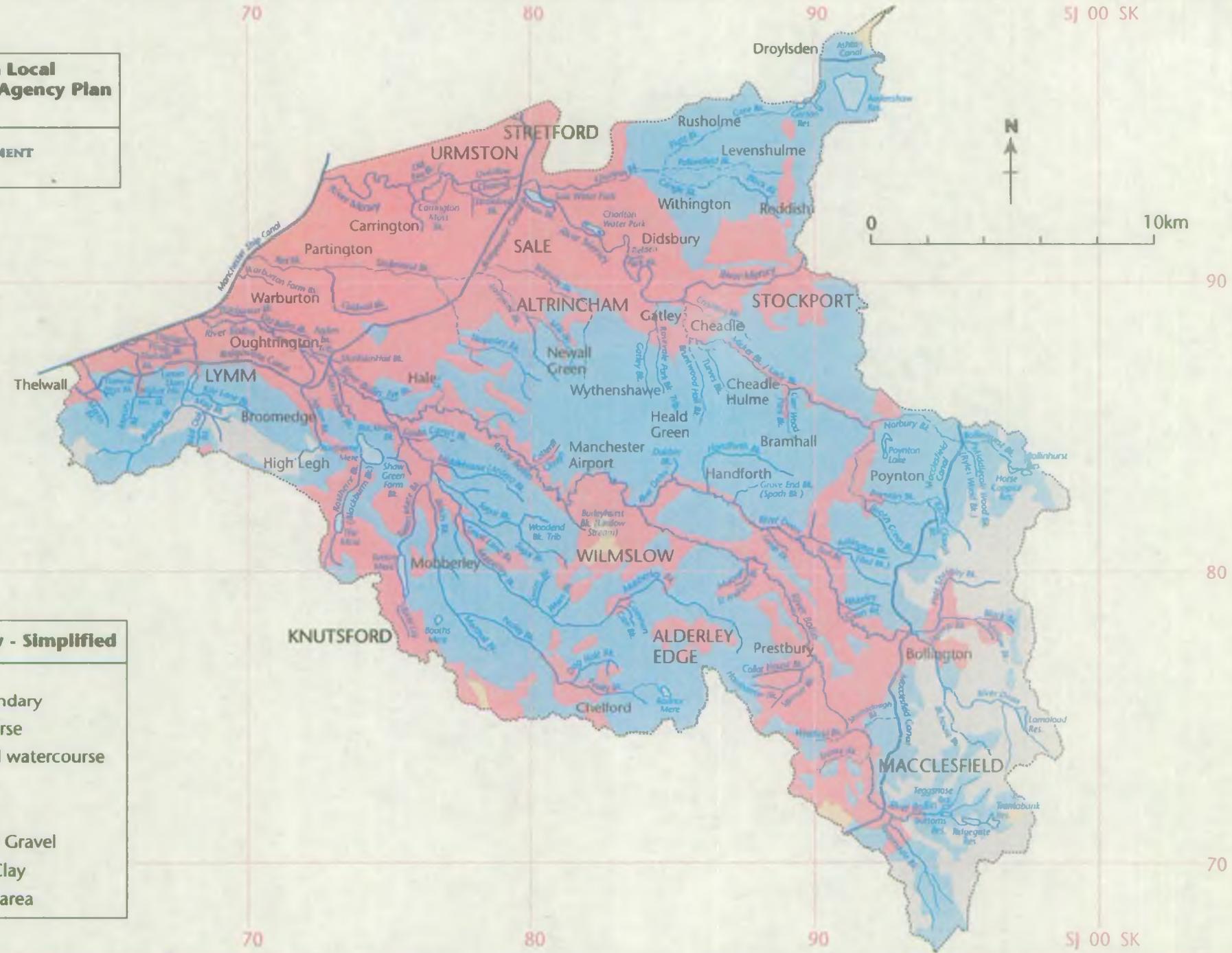
With the exception of the Carboniferous hills to the east of Macclesfield, the bedrock of the catchment is almost entirely covered by drift deposits, mainly of glacial origin. These are comprised mostly of 'Boulder Clay', although extensive sheets of sands and gravels are present in the area around Prestbury and Bollington, and north of a line from Lymm to Stockport. See Map 12a.

Where present, the glacial clay will restrict rainfall recharge and also provide some protection against pollution from surface activities. Conversely, the more permeable sands and gravel deposits act as minor aquifers in their own right, as well as providing potential pathways for recharge and contamination. They can contribute a significant component on baseflow to watercourses that cut into them, for example along stretches of the Bollin and most of the Mersey and its tributaries.

Mersey/Bollin Local Environment Agency Plan
Map 12a



ENVIRONMENT
AGENCY



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Mersey/Bollin Local Environment Agency Plan Map 12b



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Partington

STRETFORD
URMSTON

Withington

Droylsden
Carrington
Carrington Moss Bl.

Didsbury

0

10km

90

ALTRINCHAM

STOCKPORT

Hale

Newall Green

Gatley

Cheadle

Cheadle Hulme

Bramhall

Poynton

Collinswood

80

Thelwall

LYMM

Broomeedge

High Legh

KNUTSFORD

Mabbury

WILMSLOW

Chelford

ALDERLEY
EDGE

Prestbury

BOULTON

MACCLESFIELD

80

Solid Geology - Simplified

KEY

- Area boundary
- Watercourse
- - - Culverted watercourse
- Canal

Permo-Triassic:

- [Hatched] Mercia Mudstone
- [Yellow] Sandstone

Carboniferous:

- [Black] Coal Measures (Westphalian)
- [Grey] Millstone Grit Series (Namurian)

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1.7 Water Abstraction - Surface and Groundwater

There is a large demand of water for spray irrigation purposes within the LEAP area, especially within the River Bollin catchment. There are a total of 65 irrigation licences covering both agricultural use and for the watering of golf courses. Of these irrigation licences, 22 are from groundwater sources and 43 from surface water sources. Demand has increased for irrigation water within the last decade such that parts of the LEAP area would not be able to support further abstractions without the need for winter filled storage reservoirs for surface water sources.

There are many sources in the upper reaches of the catchment used for private water supplies and agricultural use, most of which are exempt from licensing requirements.

The total quantity authorised to be abstracted on a daily basis from both groundwater sources and surface water sources for all uses is 292.133 Ml/d. Of these 71.309 Ml/d is from Groundwater sources and 220.825 Ml/d from surface water sources.

1.7 Water Abstraction - Surface and Groundwater

Introduction

The 1995 Environment Act gives the Environment Agency the statutory duties and responsibilities relating to the planning and management of water resources.

It is specifically responsible for Licensing and enforcing abstractions made from water held in natural underground storage and from all surface waters above the tidal low water mark. The responsibility for licensing impoundments of watercourses also lies with the Agency. The responsibility for public water supply in the LEAP area lies mainly with North West Water Ltd.

To support the Agency in carrying out its water resource management function it is essential to collect quantitative data on the various aspects of the hydrological cycle. Water Resources staff routinely monitor rainfall quantity and intensity, surface water level, river flow and groundwater levels.

The Agency also has a consultee role regarding applications for planning permission. This means that the Agency's views and advice are given on applications which can affect the demand for, or quality of, water resources.

The Agency's water resources activities are also influenced by certain EC directives which have bearing on the quality of water resources for public water supply and other purposes.

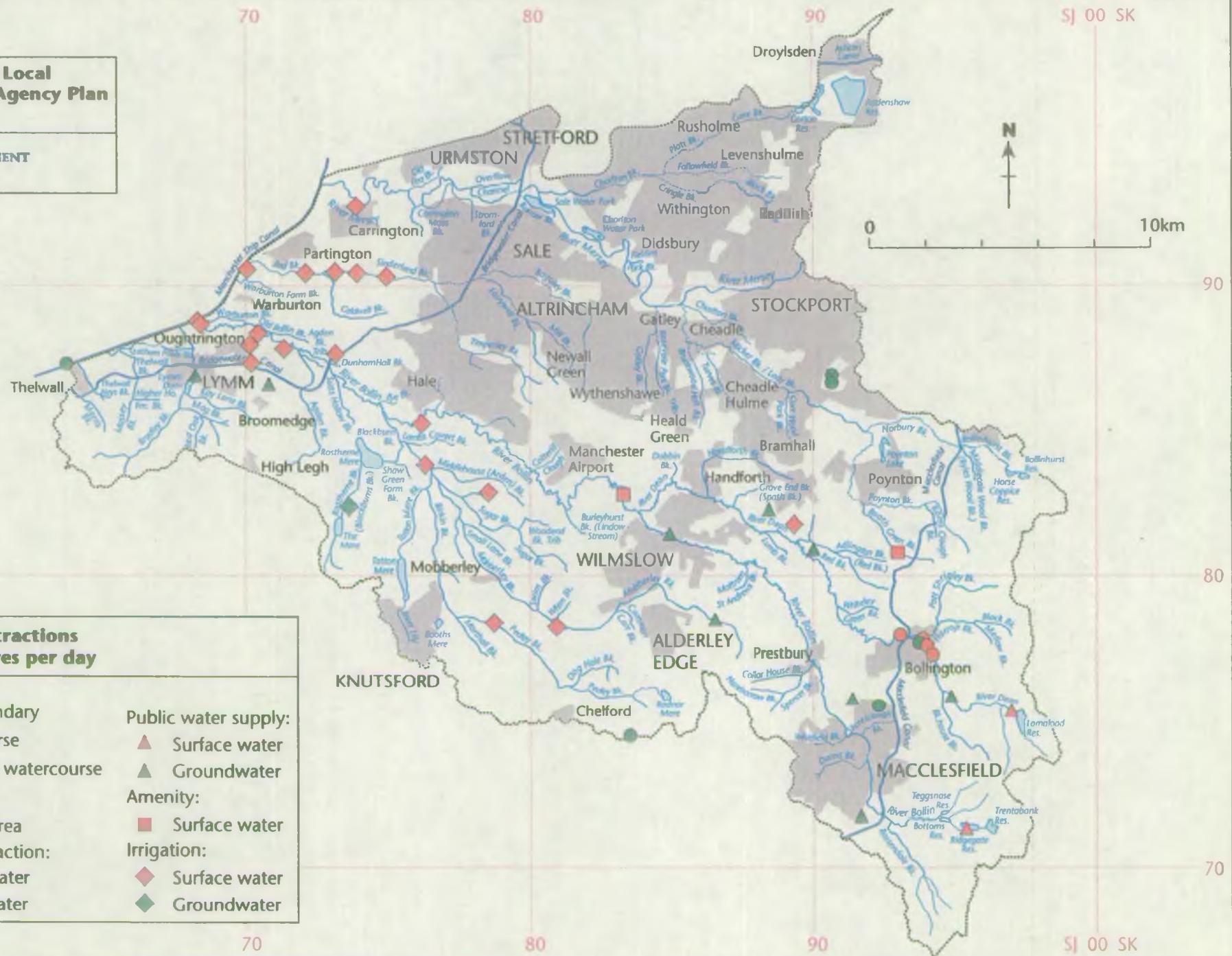
Water Usage

There are currently 196 licensed abstractions in this Leap area. Of these, almost 65% are from groundwater sources with the remaining 35% being from surface sources. The head water of the rivers Dean and Bollin are reservoired and these are used for public water supply purposes. These include Ridgegate, Trentabank and Lamaload reservoirs. Langley Bottoms and Teggnoose reservoirs provide compensation water to form the start of the River Bollin at Langley, Macclesfield.

Hydrology is used to optimise reservoir use by modelling reservoir refill characteristics, drawing largely on long term rainfall needs. Water for public water supply is also imported from outside the catchment. During the drought of 1995/96, the compensation water discharge from Langley and Teggnoose reservoirs were reduced through the granting of a Drought Order issued to the Agency to protect the ecological value within the reservoirs. There are 12 current abstraction licences authorising abstraction for Public Water Supply purposes, 9 being from groundwater sources and 3 from surface water sources.

43% of the licences in the catchment authorise abstraction for small scale agricultural use. Of these, many rely on groundwater sources. The total quantities authorised to be abstracted on a daily basis for all uses from surface sources is 220.825 Ml/d of which 20.184 Ml/d (9%) is to provide for public water supply. The largest single abstraction is for cooling water purposes at Montell Carrington from the River Mersey at Carrington (163 Ml/d) (See Map 11).

**Mersey/Bollin Local Environment Agency Plan
Map 11**



**Licensed Abstractions
>0.5 Megalitres per day**

KEY	
.....	Area boundary
—	Watercourse
—	Culverted watercourse
—	Canal
■	Built up area
Industrial abstraction:	
●	Surface water
●	Groundwater

Public water supply:
▲ Surface water
▲ Groundwater
Amenity:
■ Surface water
Irrigation:
◆ Surface water
◆ Groundwater

1.8 Area Drainage

General

Corporate Objective

One of the corporate aims of the Environment Agency is to provide effective flood defence for people and property from rivers and the sea and to provide adequate arrangements for flood forecasting and warning.

The Nature of Flooding

Rivers and watercourses can only cope with a certain maximum flow and when this is exceeded flooding occurs. Flooding can be caused by extreme weather or problems associated with the river channel itself.

Individual watercourses can respond differently to the same rainfall conditions due to variations in catchment areas and land use. For example, an urbanised catchment with a high proportion of paved surfaces and drains will have rivers whose levels respond quickly to rainfall. A more rural catchment will allow more of the rain to soak into the ground, and thus slow down runoff, so river levels will rise at a slower rate, but will then remain at a higher level for longer. This LEAP area contains a range of catchment types.

Localised flooding may occur where watercourses become blocked at particular points such as bridges or inside culverts. This can be a particular problem in urban areas where garden rubbish and debris left on bank tops, can find its way into the watercourse. There is also potential for flooding where either surface water drainage capacity is exceeded or drains are unable to discharge because of high water levels in the river.

When the watercourse exceeds its capacity the water flows onto a floodplain. These natural floodplains (which are as much a part of the river system as the channel that carries the normal flow) provide extra capacity for the storage and continuation of floodwater. This extra capacity is reduced if significant areas of floodplain are raised, embanked or built upon. The loss of storage volume can lead to higher river levels and consequently it becomes impossible to alleviate flooding in all areas. The priority for flood alleviation lies in urban areas, as rural undeveloped floodplains should be allowed to maintain their natural role.

The Local River System

The LEAP area comprises of an area of 535 km² and contains 373 km of Main River. The primary rivers in this LEAP area are the Mersey and Bollin. The two catchment areas for these rivers and the lengths of Main River are shown in Table 5 below.

1.8 Area Drainage

Table 5

Catchment Statistics	Main River Length (km)	Area (km²)
Mersey Catchment	126	223
Bollin Catchment	247	312
Total	373	535

i) The Mersey Catchment

The River Mersey originates in Stockport, at an altitude of 40m AOD, at the convergence of the Rivers Tame & Goyt. From Stockport the Mersey flows in a westerly direction, initially confined within a walled channel, as far as Heaton Mersey where the river is able to flow across the flood plain. From here the river flows past Northenden, Chorlton, Ashton-on-Mersey and Flixton, before outfalling into the Manchester Ship Canal downstream of Irlam Weir at an altitude of 12m AOD.

The largest tributary of the Mersey is Micker Brook, which drains the south of Stockport, Bramhall and Poynton, with altitudes rising to 400m AOD. Micker Brook joins the Mersey to the north of Cheadle. The next largest tributary is Chorlton/Platt/Gore Brook. This drains the heavily urbanised areas of Chorlton, Fallowfield, Rusholme, Gorton & Audenshaw. There are many culverted sections in this brook before it joins the Mersey at Sale Ees.

Although not a tributary of the Mersey, Sinderland Brook is included in this sub-catchment. This brook which drains the areas of Altrincham, Timperley, Baguley & Withenshawe, flows in a westerly direction before joining the Manchester Ship Canal at Partington.

ii) The Bollin Catchment

The River Bollin rises within Macclesfield Forest at an altitude of 359m AOD. It then flows generally westwards through Trentabank, Ridgegate and Bottoms Reservoirs towards Macclesfield. From there it flows in a northwesterly direction to Bollin Point, where it joins the Manchester Ship Canal at an altitude of 10m AOD.

The Bollin flows through Prestbury and Wilmslow, to its confluence with the River Dean. The River Dean drains Lamaload Reservoir, to the east of Macclesfield and flows through Bollington and Handforth.

1.8 Area Drainage

From the confluence with the Dean, the Bollin flows to the south of Manchester Airport, Altrincham, Dunham and Warburton to the Manchester Ship Canal. At Altrincham Mobberley Brook (Birkin Brook) which drains Alderley Edge and Knutsford joins the Bollin.

Although not tributaries of the Bollin, Bradley Brook, Thelwall Brook, and Morris Brook to the southeast of Warrington are also included within this sub-catchment area

Historical Background

The LEAP area is situated between the south of the Manchester conurbation and northern towns of Cheshire.

On the River Mersey, as the Manchester conurbation has grown, development adjacent to the river has narrowed the river corridor width and now much of the channel is embanked to prevent frequent flooding of adjoining land and property. To further limit the uncontrolled flooding of the flood plain two large flood storage reservoirs are operated at Sale and Didsbury.

In contrast, the land drained by the Bollin downstream of Wilmslow is agricultural. In this area the Bollin, and its tributaries, have minimal gradients particularly in the lower reaches. The watercourses in this area are prone to siltation and hence require a high degree of maintenance to protect the surrounding high quality arable land.

Historical Flood Events

Historically, large floods have occurred on the River Mersey in 1799 & 1828, when the Bridgewater Canal was badly damaged. The highest water levels on record occurred in July 1973 when the river level at Brinksway (in Stockport) reached 38.07m AOD which is 4.2m higher than its dry weather level. At other locations records exist which suggest that a flood event in January 1948 may have exceeded this level. Since the construction of the flood basins at Sale & Didsbury the highest flood levels recorded at Brinksway have been in December 1983 (36.89m), December 1986 (36.75m) & December 1991 (37.40m).

Flood pins are reference points at various locations to which records of high water levels in rivers are related. There are 71 such reference points in the River Mersey catchment, and a further 45 in the River Bollin Catchment. These can be further broken down as follows:

Table 6

Location	No.	Location	No.
River Mersey	25	River Bollin	23
Chorlton & Platt Gore Brooks	11	River Dean	8
Cringle & Black Brook	14	Rossendale Brook	4
Sinderland Brook catchment	21	River Bollin tributaries	10

1.8 Area Drainage

These flood pin records show high water levels that have been recorded since the late 1960's. Entries include those flooding events occurring in 1979 & 1981 (Sinderland Brook Catchment), 1964 & 1986 (Lower Bollin below confluence with River Dean), 1973 & 1987 (River Dean), and 1973 (Upper Bollin).

Flood Defence Framework

Introduction

In undertaking its flood defence and land drainage functions the Agency operates within duties conferred by legislation. This legislation imposes a basic duty on the Agency to "exercise a general supervision over all matters relating to flood defence". The degree of supervision, which is exercised over a particular watercourse, depends on whether it is classified as Main River or Ordinary Watercourse.

Main River

All watercourses are classified as either "Main River" (shown on main river maps held by the Agency and MAFF) or "Ordinary Watercourse" (sometimes referred to as "non-main river"). In broad terms Main River includes all watercourses that contribute significantly to a catchment's drainage, though ordinary watercourses may be more significant locally within the catchment. The distinction between the two is made for administrative purposes to identify those lengths of watercourse where the Agency has specific powers. The appropriate legislation regarding main rivers is found in the Water Resource Act 1991. The common law obligations and statutory responsibilities of riparian owners are unaffected by the distinction. Local Authorities, or sometimes internal drainage boards, have powers to carry out flood defence works on ordinary watercourses. The appropriate legislation regarding ordinary watercourses is found in The Land Drainage Act 1991.

The Agency may propose to change the status of a watercourse from "ordinary" to "main" if there are flood defence problems associated with the watercourse which require the use of permissive powers. The final decision on whether a length of watercourse is "mained" rests with the Ministry of Agriculture, Fisheries and Food (MAFF). This is only taken after a period of consultation, including advertisement.

The Main Rivers within the LEAP area are identified on Map 13.

Relevant Legislation

The Agency's flood defence powers, duties and responsibilities are contained in the Environment Act 1995, The Water Resources Act 1991, The Land Drainage Act 1991, and in Regional land drainage byelaws.

Flood Defence Activities

As part of the general supervision of watercourses, the Agency records incidents of actual flooding which are then investigated to try and identify the reasons for the flooding and what, if anything, can be done to alleviate it. Consideration would be

**Mersey/Bollin Local Environment Agency Plan
Map 13**



ENVIRONMENT AGENCY



1.8 Area Drainage

given to using permissive powers to promote improvements only if the proposed works are economically justified, and technically and environmentally feasible.

It is often necessary to balance the need to protect people and property from flooding with the environmental impact of undertaking works in a watercourse. In particular the Agency has to consider the impact on natural features, protection of features of historic interest and the conservation and enhancement of wildlife. Through consultation with internal conservation staff, local and national environmental organisations and the local public, the Agency will seek to achieve this balance before commencement of flood defence works or maintenance works.

The Agency fulfils its duty of general supervision of flood defence matters by operating in the following distinct areas:

- (i) Maintenance activities - on "Main River" watercourses and flood defence structures.
- (ii) Flood Defence Improvements - construction of new or improvement of existing flood defences.
- (iii) Development Control and Land Drainage Consent - through liaison with Local Planning Authorities, consultation on Planning Applications and through consideration of applications for Land Drainage Consent.
- (iv) Flood Warning - the provision and operation of flood warning systems.

Maintenance Activities

Introduction

The Agency supervises all flood defence matters and has permissive powers to carry out or control work on main rivers according to available resources and priorities. The Agency does not own watercourses except in a few specific locations, such as flood defence structures, which have been constructed, and the ownership retained. The ultimate responsibility for the upkeep of a watercourse rests with the riparian owner.

Regular maintenance is essential if the river system and sea defences are to operate properly at times of high water levels. Such maintenance works include vegetation control, repairs to earth embankments and other flood walls, obstruction/blockage removal and dredging. Maintenance can contribute significantly to reducing the risk of flooding.

Maintenance Strategy

The maintenance requirements of a watercourse depend on the extent of modification and the presence of structures and adjoining buildings. This is because where access is difficult, maintenance tends to be less frequent, but involves heavier works. Wherever possible works are carried out to take into account the natural ecosystem and the seasonal activities of the flora and fauna present, such as migratory or breeding fish and nesting birds.

1.8 Area Drainage

During high flow conditions the Agency's priorities are to check and operate flood defence structures, clear debris screens and remove blockages to culverts and the river channels. Emergency works are also carried out as necessary.

Table 7 River and Culvert Characteristics

Catchment	Area Km2	Main River Length (km)	No. Culverts >30m	Total length of culverts. (Km)(>30m)
Mersey	223	126	##	##

Maintenance Expenditure within the LEAP Area

The 1998/99 maintenance expenditure within the LEAP area was as detailed in the table below.

Table 8

Catchment	Main River Length (km)	Maintenance Expenditure (£k)
Mersey	126	##
Bollin	247	##

Emergency Maintenance

At times of heavy rainfall the Agency's operational priorities are to clear debris and identified obstructions where possible, patrol defences and carry out any emergency repairs as required. During these emergency situations Local Authorities and the Fire Services may also provide assistance.

District Councils have powers to offer assistance to owners and occupiers during floods, whereas generally the County Councils are responsible for public highways and would deal with any flooding problems associated with road drainage. Unitary Authorities broadly combine the powers and responsibilities of County and District Councils. Surface water sewer systems are the responsibility of the local Water Company who may sometimes use District Councils as their agents. All County Councils and Unitary Authorities have Emergency Planning Officers who may become involved in more serious flood events.

Mersey/Bollin Local Environment Agency Plan Map 14



ENVIRONMENT
AGENCY



1.8 Area Drainage

Maintenance Problems within the LEAP area

The following are examples of particular problems found in the area:

- Illegal tipping into and adjacent to watercourses;
- Access problems for undertaking maintenance works;
- Dereliction leading to collapsing walls and structures leading to potential blockages;
- Tree growth in walls leading to instability.

Flood Defence Improvements

Appraisal of Proposed Flood Defence Improvements

As an aid to decisions on requirements for works the Agency has determined 'Standards of Service' for flood defence based on land usage within the floodplain. Improvements to flood defences will only be considered where the existing standard of protection is less than the 'indicative standard' for the land use type. These indicative standards are recommended by MAFF. Five 'land use bands' have been established, based on the presence and concentration of certain features. These include housing, commercial property, agriculture, highways and other transport networks.

Table 9 Land Use Categories

Land Use Band	Indicative Standard of Protection	
	Non-tidal (Fluvial)	Tidal
High Density Urban	100	200
Medium Density Urban	75	100
Low Density Urban/ Rural	25	50
Arable farming with isolated properties.	10	25
Low productivity agricultural land. Sparsely populated.	1	5

The River Corridor Land Use types within the LEAP area are shown on Map 14.

A comparison of target and actual standards of service allows improvement and maintenance work to be prioritised towards those rivers which do not meet their target standards.

To be considered economically viable, any project to improve flood defences must cost less than the benefits that accrue to society generally in terms of averted flood damages. In assessing the averted damages a financial value is allocated to certain features affected, based on the potential losses to society.

1.8 Area Drainage

If, following the initial investigation into a known flooding problem, it appears that a flood defence improvement scheme is viable then the project will enter the Agency's Capital Programme and a feasibility study will be undertaken to consider the options. An assessment of these options will then determine whether a project proceeds to the design and construction stages.

Programme of Capital Works in the LEAP Area.

The following areas have specific flooding problems, which affect residential or industrial properties. Schemes to alleviate the problems are planned or are already proceeding.

River Mersey Rehabilitation	Design stage	(£ 12 millions)
Cringle Brook	Recently completed	(£ 1.5 million)

Other areas which are subject to flooding problems and which will be investigated in the future with a view to the implementation of an improvement scheme, maintenance plan or flood warning procedure include #####.

Duty of Care for Conservation

All new schemes and maintenance works are carried out after consultation with our conservation staff to ensure the work is environmentally acceptable. Under the legislation three main areas have to be considered, namely to take into account the impact of proposals on natural features, to have regard to protecting features of archaeological, architectural, engineering or historic interest, and to further the conservation and enhancement of flora, fauna and other natural features.

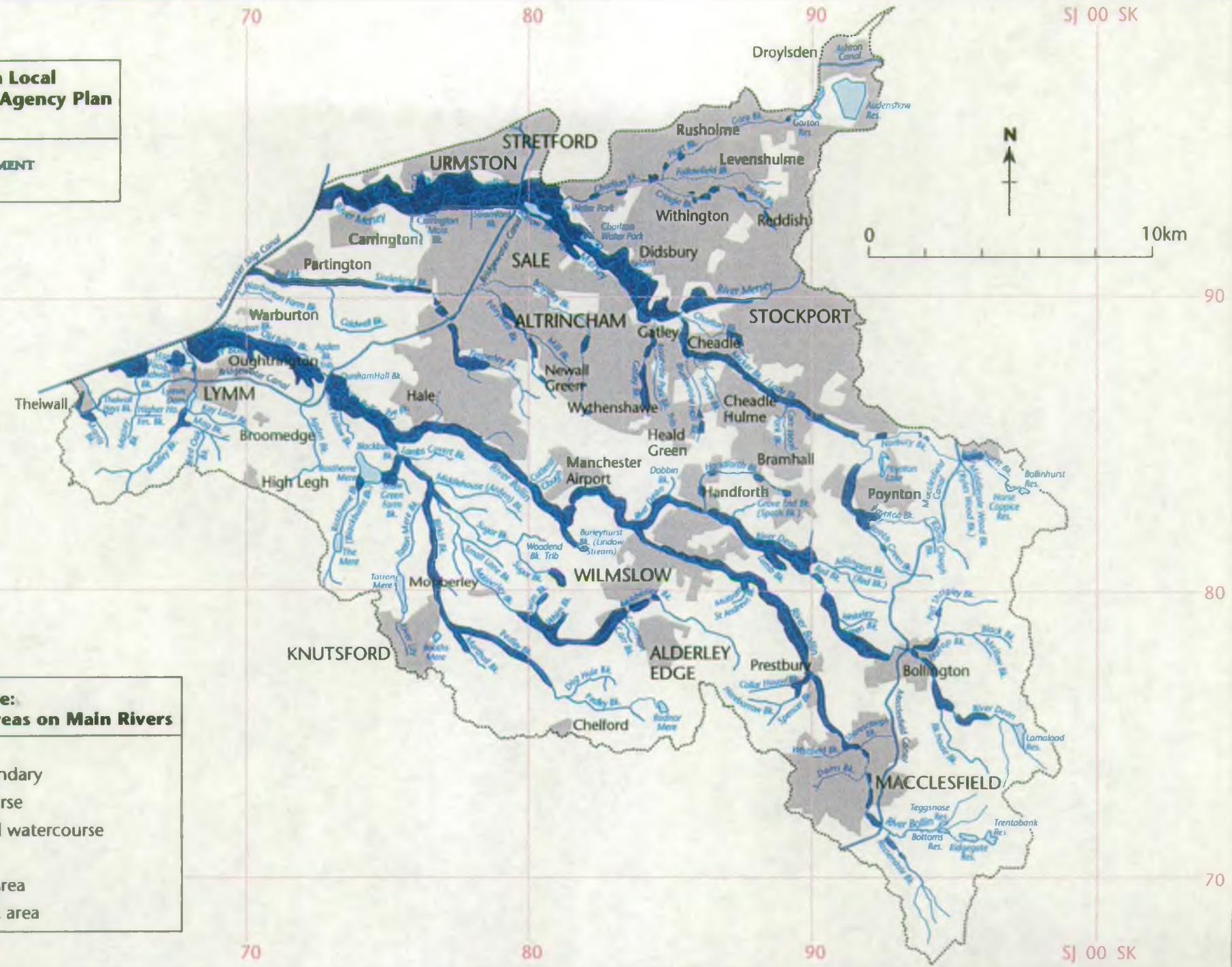
Development Control and Land Drainage Consents.

Introduction

It is preferable to avoid increased risk from flooding through control of development than to have to carry out works to alleviate problems once they occur. The relevant authority for controlling development in the floodplain is not the Agency but the local planning authority through the Town and Country Planning Act 1990 process.

Local planning Authorities and the Agency are required by the Department of the Environment/MAFF in Circular 30/92, -"Development and Flood Risk", to liaise closely on flooding and surface water runoff matters. As a statutory consultee in the Planning process the Agency has the opportunity to influence their decisions. To help in this process the Agency has developed a clear policy on the issue which is detailed, together with guidance, in the document "Policy and Practice for the Protection of Flood Plains" (1997).

Mersey/Bollin Local Environment Agency Plan
Map 15



1.8 Area Drainage

The Objectives of the Agency's Floodplain Policy are as follows:

- Development should not take place, which has an unacceptable risk of flooding, leading to damage to life, damage to property and wasteful expenditure on remedial works;
- Development should not create or exacerbate flooding elsewhere;.
- Development should not take place, which prejudices possible works to reduce flood risk;
- Development should not cause unacceptable detriment to the environment;
- Natural floodplain areas are retained and where practicable restored in order to fulfil their natural function.

The Agency aims to ensure that flooding risks that might arise from a development are recognised and made an integral part of the decision making process undertaken by local planning authorities. In this respect the Agency has a duty to carry out survey under Section 105 of the Water Resources Act 1991 to define the nature and extent of flood risks. These floodplain maps will encourage development away from flood risk areas. For this LEAP area, work towards the Section 105 maps is already underway, as part of the larger 'Upper Mersey Catchment', and is due for completion by December 2000.

Existing flood risk areas can be seen on **Map 15**.

Land Drainage Consents

The Agency's consent is required for works on or near the bank of a main river. This includes construction in, over, under or within 8 metres of the watercourse including such activities as the planting of trees and mineral extraction. On ordinary watercourses, consent is only required for building any structures that would affect the flow within the watercourses. These powers are used to ensure that people both upstream and downstream of the proposed works are not exposed to an increased risk of flooding.

Access along riverbanks for personnel and equipment needs to be preserved wherever possible especially for emergency works. To ensure this access is maintained the Agency would not grant a consent to any development within 8 metres of a main river watercourse which would compromise flood defence activities.

In deciding whether to issue consent the Agency must take into account the effect the proposed works will have on the environment.

The granting of planning permission does not negate the need for Land Drainage Consent.

1.8 Area Drainage

Surface Water Source Control

Surface water runoff tends to increase as a result of new developments where impermeable surfaces such as roofs and pavements are constructed to replace natural green field sites. Traditional drainage schemes on new developments collect and channel the water through surface water sewers and thus increase the amount and flow rates of water reaching the rivers, and transporting with it increasing amounts of pollution. This can lead to a greater risk of flooding downstream and unnatural fluctuations in flow, which cause environmental damage and pollution. Whilst the impact of an individual development in terms of increasing the flood risk elsewhere may be relatively small, the cumulative effect of several such developments can be significant.

Some of these issues have been addressed in the past and technical solutions involving the use of soak-away, infiltration, storage ponds, swales, and other attenuation devices have been used in an attempt to minimise the impact of surface water runoff with varying degrees of success. The Agency is committed to improving the control of surface water runoff and water quality associated with new developments and is undertaking a number of initiatives to encourage Best Management Practices, or 'Sustainable Urban Drainage Systems' (SUDS). A Memorandum of Understanding (MoU) has been signed between the Agency and North West Water plc on Urban Drainage.

The active promotion of surface water source control techniques will be encouraged where both possible and appropriate with respect to all existing and proposed developments. This will include the concept of integrating the methods of surface water disposal to be compatible with site layouts, roads, gardens, car parks and particularly open spaces. The incorporation of wetlands and reed beds into the drainage design has been proved to be beneficial for environmental, water quality, and river control reasons, and will also be encouraged where practicable.

The successful implementation of this strategy will depend on a close working relationship between the site owner, developers, the Agency, North West Water and the Local Authorities.

Flood Warning

Flood Warning Responsibilities

The Agency recognise that irrespective of attempts to minimise the risk from flooding through the implementation of various policies and actions, flooding can occur and on occasion represents a risk to human life. With regard to public safety we operate a flood forecasting and warning service which uses rain gauge and river level data from a number of sites, radar and rainfall forecast data from meteorological agencies, and information from flood defence personnel in the field.

The Agency takes the lead role in passing flood warnings to people who live in the Agency's formal flood warning zones by telephone or by using loud hailers. It also has formal agreements with the emergency services and the Local Authorities. In addition flooding information is provided using the flood call system and the media.

1.8 Area Drainage

Although flooding may not be prevented, the risk to life and the extent of damage would be reduced.

Regular flood warning seminars are also held to review the effectiveness of the flood forecasting and warning process.

Flood Warning Standards of Service

To ensure that timely warnings are issued to the right people, the Agency operates a system of Flood Warning Standards of Service. By defining lengths of river or reaches, with common land use interests, residential areas with a high population concentration can be treated as priority. It is the Agency's aim to provide a two-hour warning before commencement of flooding wherever practicable.

Formal and Informal Flood Risk Zones in the LEAP area

There is one formal flood risk zone in the River Mersey catchment. This zone incorporates the operation which we operate in the Flood Storage Reservoirs at Sale and Didsbury. When there is a risk of flooding an automatic voice messaging service informs local residents and businesses of any potential flooding incidents. Warnings are also given using local radio and teletext, as well as notifying Local Authorities and the emergency services. This zone covers the River Mersey between Stockport and Carrington, where high water levels are detected by a water level gauge in the river at Brinksway.

There are no formal flood risk zones in the Bollin catchment. However, after severe flood events in 1998 we have agreed to pass raingauge alarms from Prestbury and Langley Bottoms to Macclesfield BC for information.

There are four informal flood warning zones in the LEAP area at present. ie. Timperley (Timperley Brook), Brighton Grove (Charlton Brook), Ladybarn (Gringle Brook), and Athol/Mauldeth Road (Platt Brook). These are areas where only a few properties would be at risk of flooding and involve an operational response by Agency personnel, including debris screen clearance. Warnings are given on a best endeavour basis if flooding is predicted.

1.9 Waste Management

General

Every household, business and industry produces waste. The safe handling, treatment and disposal of waste is essential to the health and wellbeing of the environment and the community, and it is the remit of the Agency to ensure that waste does not cause pollution of the environment, harm to health or serious detriment to amenity. The Agency does this by assessing the types and quantities of waste produced, by registering and monitoring the carriage of waste and by licensing and monitoring the keeping, treatment and disposal of waste.

Wastes that are not classified as controlled waste and hence do not fall within the waste management licensing regime include waste from mining and quarrying operations, agricultural waste, decommissioned explosives and most radioactive waste.

The key areas of the Agency's role in waste regulation are summarised briefly as follows.

Waste Management Licensing

A licensing system for waste management sites was first introduced in 1976, with the present licensing regime introduced in 1994 under the Environmental Protection Act 1990. Licences are required for landfill sites, transfer stations, civic amenity sites, treatment plants, and processing and storage facilities, including scrap metal yards. The Agency is responsible for issuing and enforcing these licences, and for registering the various activities that are exempt from the need for a licence.

An application for a licence, containing details of the proposed operation, must be made in writing to the Agency, who will consider it and seek comments from a range of consultees. Planning permission is also usually required for the development of a waste management facility. The Agency is responsible for assessing whether the applicant is a fit and proper person, which depends upon technical competence, financial capability, and any convictions for relevant offences. Subject to these provisions, and provided the applicant is a fit and proper person, the Agency must issue a licence unless it is satisfied that rejection is necessary in order to prevent pollution of the environment, harm to human health, or in certain cases, serious detriment to the amenities of the locality.

The waste management licence has conditions that are specific to that site and type of operation and relate to site preparation, infrastructure and operation, pollution control monitoring, records and completion of the site. Failure to comply with any condition of a licence is an offence.

The Agency has a duty to ensure compliance with licence conditions, and that the prime objectives of the licensing system are being achieved. This involves making frequent inspections of licensed facilities, and taking enforcement action if necessary. The Agency also has a duty to assess all licences for compliance with the EC Directive on groundwater protection (80/68/EEC) and many of the licences in the area are undergoing such reviews. Licences can only be surrendered when the Agency is satisfied that the condition of the land

1.9 Waste Management

is unlikely to cause pollution of the environment or harm to human health.

Registration of Waste Carriers

With certain exceptions, any person who transports controlled waste in the course of their business, or in any other way for profit, must register with the Agency. Registration can be refused or revoked under certain circumstances.

These provisions are an integral feature of the Duty of Care system, which requires persons to take all reasonable steps to ensure that waste is contained, handled and disposed of safely. In particular, waste must only be transferred to authorised persons (such as registered carriers or holders of waste management licences), and such transfers must be documented. The objective is to assign a clear responsibility for waste at every stage from point of origin to place of final disposal, in order to avoid environmental pollution or harm to human health.

Special Wastes

Certain wastes are regarded as being particularly difficult or dangerous to dispose of, and are subject to additional controls. 'Special Waste' controls were first introduced in 1981, and a new set of regulations came into force on 1 September 1996. Typical examples of Special Wastes include acids, alkalis, industrial solvents, oils, pesticides and pharmaceuticals. The regulations require waste producers or carriers to inform the Agency of the intention to dispose of a consignment of Special Waste, and a consignment note tracking system then provides confirmation that any particular consignment of Special Waste has been disposed of at a site licensed to receive it.

Transfrontier Shipment of Wastes

The movement of wastes between different countries for disposal or recovery has generated much concern in recent years. Legislative controls were introduced in 1988, to regulate the movement of hazardous wastes within, into and out of the EC. In 1994, the UK Transfrontier Shipment of Waste Regulations came into effect, relating to the movement of all wastes for recovery and disposal.

Enforcement

The Agency's enforcement role derives from the fact that any person who fails to comply with any of the regulatory provisions outlined above is committing a punishable offence. In practice, the most obvious result of illegal waste disposal activity is fly tipping, which can give rise to public health risks, environmental pollution and detriment to amenity. A variety of control measures is available, ranging from discussion and persuasion through enforcement notices and ultimately action in the courts.

Landfill Consultations

Planning Authorities are required to consult the Agency on planning applications for developments within 250 metres of existing or former landfill sites. The purpose of

1.9 Waste Management

this is to ensure that new developments are not exposed to known environmental hazards from landfill sites. The Agency will also supply information directly to developers and others about particular landfill sites, or carry out searches for landfills in the vicinity of specified locations.

Sustainable Waste Management

The Environment Act 1995 created a new duty for the Secretary of State to prepare a waste strategy - the consultation paper for which was launched in June 1998, titled "Less Waste, More Value". A strong emphasis will be placed on waste minimisation, re-use and recycling.

The Environment Agency will also be a key player in the delivery of the strategy and its future development:

- through improved collection of data, by carrying out surveys of waste arisings and facilities;
- through its regulatory functions in relation to wastes (including new responsibilities in relation to producer responsibility for packaging waste);
- through advice and guidance on good waste management practices and by sponsoring research.

In addition the Agency will provide relevant information to assist:

- waste collection authorities in their recycling plans, and in deciding their collection arrangements for household waste;
- waste disposal authorities in determining their contracts, with an objective assessment of the environmental costs and benefits of the various options for dealing with household waste;
- local planning authorities with the information they require for development plans;
- input to proposed regional waste management strategies.

Packaging Regulations

The Producer Responsibility Obligations (Packaging Waste) Regulations 1997 aim to reduce the amount of packaging waste going to landfill. This will be achieved by placing legal obligations to recycle and recover packaging waste directly on those that produce or use it. Those companies handling 50 tonnes or more of packaging per year, with an annual turnover of .5 million (reducing to .2 million in the year 2000), will be obligated if they are involved in at least one of the following activities; manufacturing raw materials used for packaging, converting raw materials into packaging, packing or filling packaging or selling packaged goods to the final consumer.

1.9 Waste Management

Local Perspective

The Mersey/Bollin LEAP area is heavily urbanised in the north around Stockport, Altrincham and Manchester, contrasting with more rural areas to the south and east. *The area includes part of the Peak District National Park.*

The northern and western part of this area is well served by the national motorway network, with parts of the M6, M56 and M60 crossing the area. The completion of the M60 ring road around Manchester (due to be opened in year 2000) will increase the number of links available. The motorway network, coupled with Manchester Airport, located in the heart of the area, will no doubt be attractive for industrial development, retail and distribution centres.

The northern part of the area, particularly east Manchester, is undergoing redevelopment due to the demise of the more traditional industries associated with older urbanised areas. Service industry, light industry and warehousing is replacing the old heavy industries, and widely differing wastes are arising, such as paper wastes, solvents, packaging and tanker washings.

The south and east of the area is predominantly rural in nature, with pockets of industrial development at some of the larger towns, for example Macclesfield.

The majority of waste generated in the area is taken to local waste transfer stations or treatment plants for sorting, prior to final disposal. The transfer and storage operations are variable in terms of size and operation - most handle a wide range of controlled wastes. These sites make a significant contribution towards materials recycling. See Map 16.

Figure 5 Licensed Waste Management Facilities

There are 52 licensed waste management facilities in the area and the breakdown is as follows:

Landfills (co-disposal)	3
Landfills (industrial/commercial)	1
Landfills (industrial factory curtilage)	2
Landfills (inert)	15
Transfer Stations	12
Household Waste Sites	10
Storage Site	1
Treatment Plants	4
Scrapyards/Car Breakers	4

(Date of information: 22/03/99)

There is only one containment landfill operating within this area that can accept household, commercial and industrial wastes. Two other landfills are licensed for industrial and commercial wastes. The majority of the landfills only accept inert waste; this is partly due to the increasing economic pressure from environmental monitoring costs and potential remediation works necessary to fulfil licence holder's obligations prior to licence surrender,

1.9 Waste Management

as well as generally broadening liability for environmental pollution.

There are approximately 178 closed landfill sites, 122 of which pre-date formal licensing controls. These are typically addressed when land is to be developed, and the Agency is consulted on all planning applications where development is to take place within 250m of such a site.

Household waste sites are provided for local residents to deliver household wastes free of charge, and all have recycling facilities for wastes such as paper, plastic, oil and metal. The Government has set a target to recycle 25% of household waste by the year 2000, but progress has been slow. The information is not available for the LEAP area, but the recycling rates of the local authorities which fall mainly within the catchment are found in the table below. The average rates of household waste recycling in Greater Manchester and Cheshire for the year 1997/98 were 4.03 and 7.95 respectively.

Table 10 Recycling Rates – Local Authorities

Local Authority	Tonnes of District Waste Collected	Percentage of Household Waste Recycled
High Peak	34337	4.80
Macclesfield	60646	13.21
Manchester	306237	2.18
Stockport	154501	9.03
Tameside	108556	4.53
Trafford	132861	3.63
Warrington	96917	6.01

There are a range of different household waste recycling schemes running within the area, in addition to the provision of household waste sites, for example the promotion of composting by supply of subsidised composting bins and kerb side collections of paper waste.

Industry already recycles large amounts of waste, either in-house as part of a process, or through the established reclamation industry, and an often overlooked portion of this is spoil and rubble arising from construction works. The Packaging Regulations also place legal obligations on some companies to recycle and recover packaging waste. There are approximately 37 companies obligated under these regulations in the LEAP area.

1.9 Waste Management

The introduction of the landfill tax on 1 October 1996 had the effect of greatly increasing the price of disposing of waste by landfilling - in some cases by around 60-70% overnight. As disposal costs at licensed facilities continue to rise, sites exempt from the need of a waste management licence, due to either the size or nature of their operation, are playing an increasingly important role in the sustainable development of the area.

The number of sites registered exempt in the area exceeds 300. These include:

Landspredding	9
Land reclamation	17
Composting	5
Storage and use of construction and demolition waste	44
Baling and sorting of waste	28
Metal recycling sites	18

In common with many other areas, there is a significant problem of illegal waste disposal activity that often results in fly tipping. This is most prevalent around the areas of highest population density, when waste is often disposed of quickly by somebody who has been paid to dispose of it properly, but often too cheaply to be legitimate. The introduction of the landfill tax was intended to encourage more sustainable alternatives to landfill, but there are fears that this increased cost will encourage fly tipping. There is also opportunist disposal by members of the public of small quantities of waste in black bin liners and so on. See Issue 9 – Action Plan.

One of the measures introduced to counter the problem of fly tipping is the Duty of Care imposed on producers of waste to ensure that their waste is only passed on to authorised persons. Anyone wishing to carry waste from a producer must register with the Environment Agency, and the Agency has the power to refuse or revoke registrations should carriers be deemed unfit. The Mersey Bollin LEAP area has approximately 400 registered waste carriers.

The presence of major industry in the area gives rise to significant production of Special Waste, most of which is transported out of the area for treatment and disposal by landfill or incineration. There are 11 sites in the area licensed to accept special wastes for storage or treatment (including 5 household waste sites that accept such wastes from the general public), 9 of which are operational.

There are currently a number of waste minimisation projects running within the area. Studies indicate that good practice measures can reduce solid waste by an average of 13%. In addition, raw material usage, power and water consumption, and labour time and costs can be reduced significantly.

The WISE project is a collaboration of industry, Department of Trade and Industry (DTI) and Stockport Business Link. It has targeted about 50 small to medium sized enterprises for an audit of their waste streams. Approximately 25 companies will go through a full audit, and be used as case studies so that other businesses can learn from their experiences.

1.9 Waste Management

The Green Business Parks project is a partnership between the Agency, English Partnerships, the Groundwork Trust and local businesses. A number of business parks across the region have chosen (in this LEAP area the focus is on Hurdsfield Industrial Park in Macclesfield) with a view to improving environmental performance. Agency funding will be used to investigate the potential for waste minimisation and pollution prevention. There is potential to develop further initiatives within the area. See **Issue 10 – Action Plan**.

Contaminated Land

Contaminated land can be a blight unless comprehensively tackled. It affects not only the water environment but also landscape and amenity quality and public health, and there are hazards associated with landfill gas migration. The principal aim of the Agency regarding contaminated land is to secure, with others, the remediation of contaminated land.

The Environment Agency operates in accordance with the provisions and duties of the Environment Act 1995. This Act places a duty on local authorities to inspect their areas for the purposes of identifying land which falls within a statutory definition of contaminated land. Land formally designated as contaminated land is subject to a number of provisions intended to ensure that unacceptable risks to health and environment are properly controlled.

The Agency has signed a protocol for Land Contamination with local authorities agreeing the principles that the two will follow in carrying out their relative roles in addressing existing contamination. This sets out a framework for information exchange, technical and procedural guidance and co-operation, in a manner that is transparent to the general public.

The principal aim of the Agency for contaminated land reported in the Corporate Plan 1998-01, is to secure with others the remediation of contaminated land.

The Agency also has a 10 Point Action Plan for the Environment, one aspect of which sets targets for Agency involvement in encouraging and supporting the clean up of seriously contaminated sites.

In conjunction with Section 57 of the Environment Act 1995, the planning and development control process will continue to be a very important and effective mechanism for dealing with contamination.

Mersey/Bollin Local Environment Agency Plan Map 18



ENVIRONMENT
AGENCY

Designated Sites of Conservation Interest

KEY

- Area boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Built up area
 - Site of Special Scientific Interest (SSSI)
 - Sites of Biological Importance (SBI)
 - Regionally Important Geological/Geomorphological Site (RIGS)
 - Local Nature Reserve (LNR)
 - National Nature Reserve (NNR)
 - Areas of intermittent toxicity as shown by invertebrates



1.10 Conservation

General

The Environment Agency has a duty to promote and enhance the conservation of the environment in all its activities and those of third parties. It does this by assessing, minimising and mitigating the ecological impacts of its own maintenance and engineering schemes and influencing local authorities, developers, landowners and other bodies through the planning and regulatory system and general liaison. We seek to protect all designated sites, the wider countryside and all habitats of local importance associated with watercourses, ponds and wetlands; and seek to influence outside organisations to protect terrestrial habitats of importance. This section relates to the conservation and enhancement of wildlife, wildlife habitats, natural beauty and geomorphological features in the river corridors. Conservation covers both designated sites and the wider countryside, associated with rivers and the water environment. See Map 18.

Local perspective

The catchments of the Bollin and Mersey contain a wide variety of natural riverine habitats for wildlife. Land uses within the catchments are also widely varied and include semi-improved or improved grasslands often interspersed with areas of mixed woodlands and industrial and urban areas. A notable feature of these catchments is the large numbers of waterbodies, for example the Cheshire Meres, large reservoirs and ponds that are valuable conservation, amenity and historic resources. The Environment Agency seeks their retention and positive management.

The upper Bollin is classed as an upland watercourse with steep gradients over a predominantly stony substrate. The rest of the Bollin and the Mersey and its tributaries are more lowland in character, with slacker gradients and a mainly sand/silt substrate.

The protection and enhancement of wildlife habitats, natural and geomorphological features is an important issue within the catchment. Threats to wildlife and habitats can arise from development encroaching into river corridors and natural floodplains, river engineering works, alterations to water levels/flow regulation, changes in agricultural practice and the infilling of lodges, ponds and reservoirs. Parts of the catchment are degraded by urban development and there are many opportunities for restoration and enhancement should resources be available.

There are 12 SSSIs (Sites of Special Scientific Interest) which can be found in the LEAP area and ~ 132 Sites of biological importance which are designated by the local authorities and include habitats and species which are of County Value for Nature Conservation. SSSIs represent the best examples of particular wildlife habitat types, geological features or landforms, or are locations of important communities and rare or endangered species.

The Bollin catchment is a contrast between the upland fast flowing streams to the east and the meandering nature of the river, through more low-lying agricultural areas, to the west. The area is of high conservation and amenity value, supporting a range of natural habitats for wildlife.

1.10 Conservation

There are a large number of designated conservation areas in the Bollin catchment. Three meres, Rostherne, Tatton and The Mere have been designated as SSSIs and are important wetland features in the lower area of the catchment. Rostherne Mere is also an internationally important RAMSAR site and a national nature reserve.

Geomorphological processes in the Bollin Valley have given rise to a considerable variety of physical features which are very important in terms of conservation value. Remnant features include river terraces, meander scars and oxbow lakes. Erosion and depositional features of the river occur throughout the extensive actively meandering stretches of the Bollin, notably downstream of Wilmslow to Dunham Massey and also throughout the River Dean. As the river actively erodes, soft earth cliffs are exposed which are utilised in a number of places by nesting sandmartins. Other sites used by sandmartins and kingfishers need to be identified, retained and protected, wherever possible, from development and/or proposals to stabilise the banks. Increased knowledge of the species distributions and nesting sites within the catchment is also desirable. In Macclesfield, the river is largely constrained within walled channel whereas downstream of Dunham it is constrained by flood embankments.

The Mersey Valley is a large, fairly flat corridor with open spaces linked by woodland and scrub. The conservation value of the River Mersey and its tributaries has been diminished to a large extent by pressure for urban development and associated road schemes. Much of the low-lying land adjacent to the Mersey is protected by substantial flood banks of fairly uniform appearance. The banks and associated berms have only sparse tree and shrub cover and little marginal habitat. Where the river has not been channelised, notably downstream of Ashton Weir, the geomorphological and ecological interest is greatly increased. A large part of this stretch has been designated as an SBI for this reason. High flows in the river are diverted to flood storage basins, which have been constructed at Sale and Didsbury.

The tributaries of the Mersey vary in their conservation interest. Poynton and Norbury Brooks in the south east of the catchment are of high conservation value, retaining their wooded corridors. Downstream, where they form Micker Brook, bank works have altered the flow regime and conservation interest is reduced. Of less conservation interest is the Chorlton Brook system, to the northeast of the catchment, which has been extensively culverted. Such culverts have fragmented the riverine environment and lead to a loss of open water and river valley habitats. Re-development of a site containing a culvert may present a good opportunity for opening up a watercourse and to create an attractive water feature. This would remove a potential barrier to fish and wildlife and restore continuity of the river corridor.

To the west of the Mersey catchment are Baguley Brook, Fairywell Brook and Timperley Brook which feed into Sinderland Brook. All are generally uniform in character and extensively channelised as they pass through heavily developed areas. There are some scattered open spaces and semi-rural areas where the river corridors are more natural. Brookheys Covert SSSI lies adjacent to Sinderland Brook and is the only SSSI in this part of the Mersey catchment.

1.10 Conservation

Pest species are an ever-increasing problem throughout the Upper Mersey catchment. These include Japanese Knotweed, Himalayan Balsam and Giant Hogweed. The latter is a particular problem at Ashton-on-Mersey on the River Mersey and in the lower reaches of the River Bollin.

Natural features are often limited in the vicinity of the large number of sewage treatment works, in areas of intensive urban development and where main transport routes cross the rivers within the catchment. Banks have in some places been reinforced using environmentally unsympathetic materials such as concrete, sheet steel piling and gabions. Opportunities for enhancement exist for example through development control and incentive schemes such as Countryside Stewardship to provide buffer zones of natural habitat along the watercourse and their corridors.

Lengths of watercourses in the catchment have been surveyed for their ecological interest with River Corridor Surveys carried out prior to flood defence river maintenance and capital schemes. However, there are gaps in this survey information which the Environment Agency would like to complete over time.

The Environment Agency has a responsibility to protect and where possible enhance stillwaters in the region. A stillwaters strategy is being formulated whereby sites may be prioritised for action and resources focussed efficiently. A large database of information has been produced for sites larger than two hectares which is to be updated in the future to include smaller stillwaters in the area. The Cheshire Meres are of particular importance in this LEAP area with many having national and international status due to the important species and habitats found at these sites which include great crested newts and pipistrelle bats. The Meres have developed in hollows formed during the retreat of the last glaciers and are often associated with a variety of wetland habitat types which show natural progressions from open water through to swamp and fen habitats to wet willow or alder woodland. The meres are particularly important for aquatic plants, insects, molluscs and birds that are dependent on open water habitats and fringing vegetation.

Our overall aim is to fulfil our responsibility towards ensuring that wildlife, landscape and heritage features of interest are protected and, where appropriate enhanced and made accessible. The landscape and features of ecological or heritage interest are of great importance in many catchments and may attract large numbers of visitors

A notable feature of the catchment is the large number of ponds with associated wetland habitats and several large reservoirs. These provide a range of standing water habitats, which often support a rich emergent and aquatic flora and fauna not found in the faster flowing and more polluted watercourses.

Rivers provide important corridors between habitats and can be used extensively by wildlife. To protect the water environment from the impact of potentially damaging activities, we recommend that buffer zones should be created along all watercourses. To avoid damage to riverbanks, which could lead to instability, increased flood risk, and a reduction in fisheries and conservation value, these zones should be protected from intensive grazing and other agricultural practices by fencing.

1.10 Conservation

Our task, in partnership with others, is to maintain and enhance the largely unspoilt nature of the Area by ensuring activities and developments are managed in an environmentally sustainable way. In particular, we need to ensure that the needs of users are balanced against the special conservation value of the area.

Mersey/Bollin Local Environment Agency Plan

Map 17



ENVIRONMENT AGENCY

Fisheries: River Habitat Potential and Actual Fish Species Recorded

KEY

- Area boundary
 - Watercourse
 - Culverted watercourse
 - Canal
 - Built up area

Potential

Recorded

- Trout (Trout, Minnow, Bullhead, Stonelach)
 - Minnow (Trout, Minnow, Bullhead, Stonelach, Chub, Dace, Gudgeon)
 - Chub (Chub, Dace, Gudgeon, Roach, Perch, Pike, Eel)
 - Bream (Roch, Bream, Tench, Carp, Perch, Pike, Eel)
 - Only marginal species present (eg Stickleback, Bullhead, Minnow, Stonelach)
 - No fish present



1.11 Ecology

General

The Environment Agency has duties to maintain, improve and develop fisheries and to further the conservation of rare fish species. Fish populations are affected by the quality and quantity of water as well as by the availability of suitable habitat. Fish are therefore important indicators of the overall health of the river.

Local Perspective

The Environment Agency undertake fish population surveys on all rivers within a five year rolling programme. The River Bollin was last surveyed in 1996, the Mersey in 1995 and the Manchester Ship Canal tributaries in 1994/5. Access can be a problem in urbanised areas and deep water can restrict sampling methodologies making it impossible to survey some stretches of the Mersey.

The watercourses covered by this LEAP provide suitable habitat for both coarse and game fish species. See Map 17. Significant brown trout populations are to be found in the upper reaches of the Dean and Bollin and their tributaries, and two Mersey tributaries (Micker Brook, Norbury Brook). Coarse fish populations can be found throughout most of the remaining catchment area.

Populations are limited in some stretches by a combination of poor water quality, due to localised polluting discharges, and unsuitable habitat. No fish populations have recently been identified in Sinderland Brook and parts of Marthall Brook, and only sticklebacks have been recorded at Baguley Brook, Fairywell Brook and isolated sites on the lower Bollin.

Stocking of some of the watercourses within the catchment has occurred. Brown trout have been introduced to the Bollin by local angling clubs, and the Mersey, Bollin and Dean have been stocked periodically with roach, dace and chub from the Environment Agency's hatchery at Leyland.

The River Bollin catchment is recognised as having the greatest potential for supporting game fish in the south of the region. However, water quality must be maintained at a suitable level throughout the river's length and a number of physical obstacles that obstruct the upstream migration of both game and coarse fish must be overcome. A fish pass is currently under consideration in plans to construct a gauging weir at Little Bollington Mill and fish passes at Northenden and Sale Ees on the Mersey have already been included in plans to renovate these weirs. Ultimately, these will facilitate the upstream migration of the fish present enabling greater distributions, spawning success and general security of the populations.

As a result of the construction of the second runway at Manchester Airport, suitable habitat for fish was lost on the Bollin and Sugar Brook. This damage is currently being offset through mitigation schemes, including the diversion of Sugar Brook, construction of downstream backwaters, meanders, riffles and pools on the Bollin, and measures to allow fish to move upstream through the Bollin tunnel.

**Mersey/Bollin Local Environment Agency Plan
Map 19**



1.12 Recreation and Amenity

General

The northern part of the Mersey Bollin LEAP area is mainly urbanised and includes the towns of Stockport, Altrincham, and Stretford. The remainder of the area includes the hills, valleys and reservoirs around Macclesfield, the Peak District National Park and the more gentle landscape to the east of the area around Lymm.

Local Perspective

There are many parks, nature reserves and areas of interest within the LEAP boundary. See **Map 19**. Some of the larger parks include Chorlton Water Park and Sale Water Park managed by the Mersey Valley Warden Service (based at Sale Water Park), Lymm Dam managed by Warrington Borough Council and Tatton Park. These parks offer facilities for informal and formal recreation. The lake at Chorlton is used regularly for coarse angling (60 fixed angling platforms), canoeing, sailing and windsurfing and hosts special events such as raft races, regattas and canoe play-schemes. There is good access for disabled on the south side of the lake. The park is closed for watersports between October and April to avoid disturbing wildlife.

Sale Water Park, which is owned by the Environment Agency, is also used for a wide variety of watersports, including water-skiing and boating which take place from Trafford Water Sports Centre. The Mersey Valley Visitor Centre, which was opened in 1984, is also situated there. The Visitor Centre houses a seasonally changing display, a staffed information desk and a café. The Mersey Valley Warden Service provides a countryside contact for local schools, volunteers, the public, landowners and farmers. Broad Ees Dole, which is a wetland nature reserve adjacent to the water park is a good location for birdwatching.

Lymm Dam has a variety of woodland and meadowland, with facilities for horseriding, angling, birdwatching and walking.

Also within the boundary are areas of woodland, parkland and open fields including Urmston Meadows, Wythenshawe Park and Stenner Woods which are used regularly for informal sports.

The canals within the LEAP boundary include the Macclesfield Canal, the Bridgewater Canal and the Manchester Ship Canal. The Bridgewater Canal, and the Macclesfield Canal, together with the Ashton Canal (which just enters the LEAP boundary near Audenshaw Reservoir) are all part of the Cheshire Ring of Canals. The Bridgewater Canal is owned by the Manchester Ship Canal Company and is available for boats up to 14 feet wide whilst the Macclesfield Canal is available for boats up to 7 feet wide and 72 feet long. The Cheshire Ring of Canals is used for pleasure boating by private boaters and by hirers. Within the LEAP boundary, however, hire boat yards are only located on the Macclesfield Canal. Because of the built industrial heritage and the wide biodiversity, there are hopes to nominate the canals for World Heritage Site Status.

The reservoirs such as Lamaload, Trentabank and Tegg's Nose also offer facilities for recreation, including informal activities such as birdwatching and walking.

1.12 Recreation and Amenity

Cycling

There are numerous cycle routes that are available throughout the area, including around Sale Water Park, Manchester Airport and Stockport and stretches along some of the canal towpaths (not the Bridgewater Canal towpaths).

Groundwork, Bollin Valley Partnership, Macclesfield Borough Council and Sustrans are working together with other partners to develop a network of cycle routes on Quiet Roads and Greenways in the Bollin Valley and Macclesfield area. They hope to develop a Bollin cycle route between Macclesfield and Prestbury, with plans to extend it through Wilmslow and Quarry Bank Mill to the Trans-Pennine Trail. These proposed routes aim to establish links between areas with high populations to tourism centres within the valley.

Groundwork Macclesfield and Vale Royal are also working in partnership with the Mersey Valley Partnership to investigate cycle routes linking the River Weaver to the River Mersey.

The Cycling Project North West has produced many leaflets indicating cycling routes around the whole of the North West area, including routes around Sale Water Park, Tatton Park, Reddish Vale and through the Mersey Valley.

There are a few Groundwork cycle hire centres in the LEAP area, including one at Tatton Park and one at Bollington.

Orienteering

Permanent orienteering courses within the LEAP area are based at Wythenshawe Park in Baguley, Gorton Reservoir, Sale Water Park and Chorlton Water Parks which was set up by Greater Manchester Orienteering Association.

Recreational Routes

The area is well served by both local and long-distance footpaths, many of which are in close proximity to watercourses and take advantage of the river valleys and canals.

The longer routes include stretches of the Trans Pennine Trail, the Mersey Way, the Cheshire Ring Canal Walk and the Bollin Valley Way. The Bollin Valley Way provides approximately 23 miles of well-marked footpath with access to the river in most cases and is managed by the Bollin Valley Partnership. The Cheshire Ring of Canals has a towpath along it and most of it is a public right of way, stretching 97 miles. These longer routes often link to the shorter paths, mainly used by the local population, to provide circular and inter-linking routes.

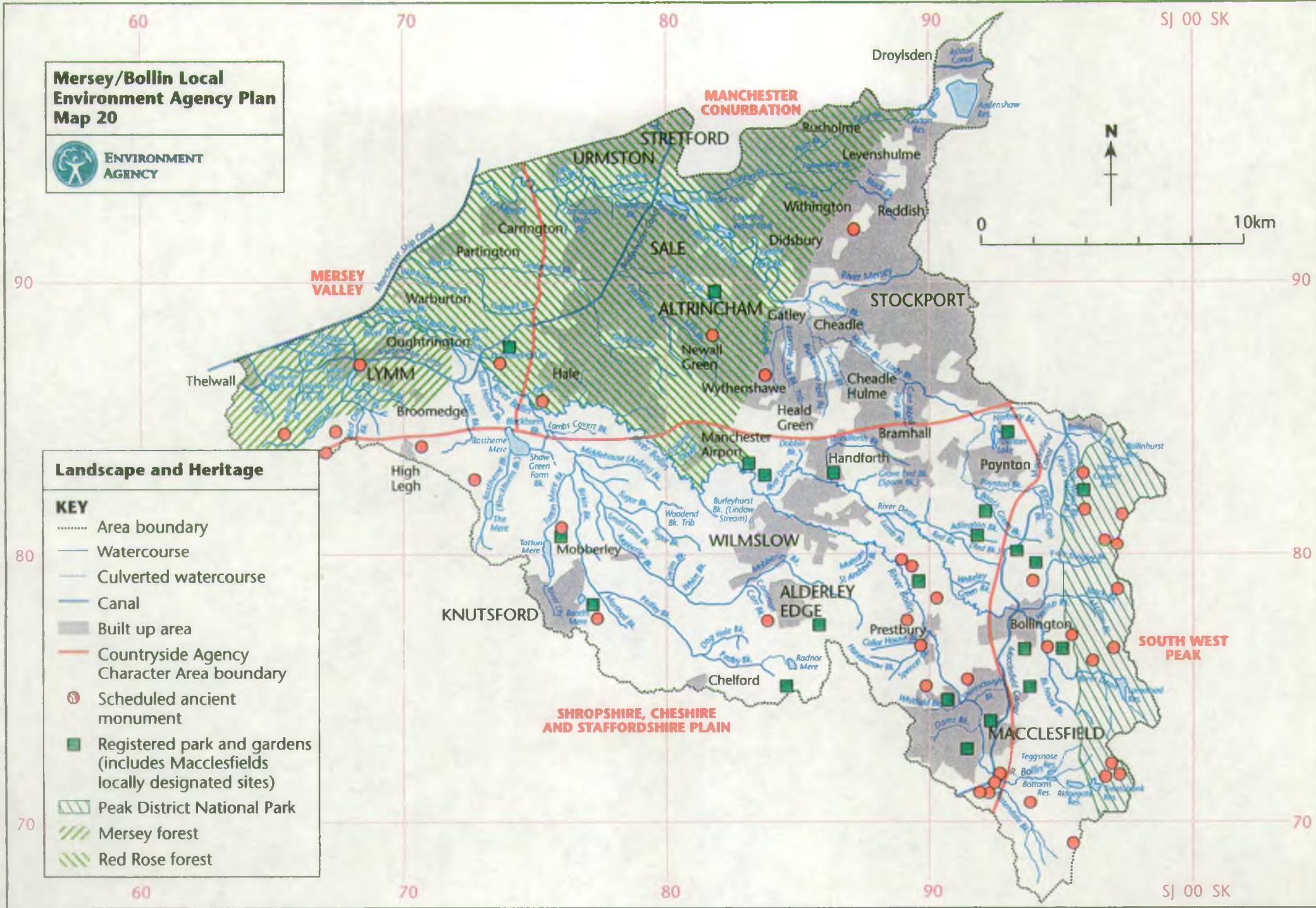
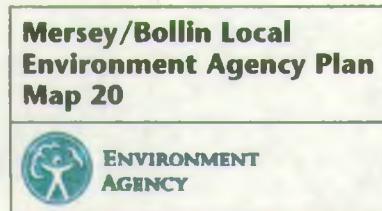
The Peak and Northern Footpaths Society, the Mersey Valley Partnership and other bodies continued to work towards improving footpath networks, repairs and maintenance and improving public access.

1.12 Recreation and Amenity

Watersports

Canoeing takes place regularly on stretches of the River Mersey and the River Bollin whilst the Cheshire Ring of Canals is used periodically by canoeists. The British Canoe Union has highlighted numerous locations on the River Mersey where improvements for public access are needed, where problems for recreational activities exist and where facilities could be improved.

There are four rowing clubs within the LEAP area, Trafford Rowing Club, Manchester University Boat Club, UMIST Boat Club and Manchester Metropolitan University Rowing Club. All of the clubs have boathouses on the Bridgewater Canal. The Bridgewater Canal, particularly at Sale, Timperley and Dunham is used for rowing practice.



1.13 Landscape and Heritage

General

The Environment Agency has a duty to conserve and enhance the natural beauty of inland and coastal waters and associated land. The Agency also has to consider the need to protect and conserve buildings and objects of historic interest associated with the aquatic environment.

Opportunities for improvement are achieved by the Agency working with Local Authorities, developers and other partners and in work undertaken as part of the Agency's capital and maintenance programmes.

Local Perspective

English Nature and the Countryside Agency (formerly the Countryside Commission), with help from English Heritage, have produced a map of England that depicts the natural and cultural dimensions of the landscape. This map, "The Character of England; landscape, wildlife and natural features" divides the country into areas of similar character. Countryside Character is what makes one place different from another area. It is the interaction of the physical factors of geology and weather with biological factors of plants and animals and, most importantly in Britain, the influence and management practices of man that gives a particular area its sense of place, its own unique character. It is now widely recognised that everywhere has its own local character, which should be respected and enhanced where possible.

For each area there is a description of the areas landscape character. These Character Areas are sometimes amalgamated into larger units known as Natural Areas, which share a similar ecology and are used by English Nature. Within the study area there are three Natural Areas: The South West Peak, the Urban Mersey Basin and the Meres and Mosses. These are subdivided into four different Character Areas. The South West Peak is a Natural Area and Character Area, while the part of the Meres and Mosses Natural Area that occurs within this area is the Shropshire, Cheshire and Staffordshire Plain Character Area. The Urban Mersey Basin in this area consists of two Character Areas, the Manchester Conurbation and the Mersey Valley. See Map 20.

The South West Peak

To the west of Macclesfield is the foothills and upland gritstone block of the Pennines. This is an integrated mosaic of landform and vegetation patterns comprising wild expanses of high heather moorland on the tops and small scale enclosed farmland with rushy pastures and herb rich meadows in the valley bottoms. In the uplands field boundaries are of stone while in the valleys fields are bounded by hedges. Woodlands are generally small and located on the steepest valley slopes. However, around Trentabank Reservoir is Macclesfield Forest, a large conifer plantation. Settlements are small and nucleated with the use of local gritstone as a building material, a particular feature of the area.

1.13 Landscape and Heritage

The area has a rich history with settlement dating back to prehistoric times. However, the enclosures of the 18th and 19th century enmeshed the landscape in a web of stone walls destroying much of the ancient patterns.

Changing agricultural practices and the fluctuating fortunes of agriculture have lead to a changing boundary between the farmland and unenclosed moorland. Currently, previously abandoned agricultural land is being brought back into production.

There are enormous recreational pressures on the area, which brings congestion to the roads and conflict on the grouse moors. There have been large increases in the number of sheep leading to changes in vegetation and many woodlands now have little undergrowth and no regeneration.

The Shropshire, Cheshire and Staffordshire Plain

The Northeast corner of this character area is within the southwest part of our study area. It is a distinctly rural, gently rolling plain. Dairy pasture dominates the area with a strong pattern of field boundaries. These mostly consist of well-managed hedges with many old hedgerow trees, principally oak. There are, however, few young trees to replace these magnificent but ageing landscape features. Intensification and diversification of farming is leading to many changes in the landscape, which need to be handled sympathetically to ensure the integrity of the area's character is maintained. Woodlands, being relatively small and few in number are restricted to the steeper valley sides. However, many of these are ancient woodlands with an attractive ground flora. Ponds are an important wildlife and landscape feature, the area having one of the highest densities of ponds in England. Large farmsteads are regularly spaced throughout with dispersed hamlets and a few small market towns. Buildings are predominately red brick, with the churches usually made from red sandstone.

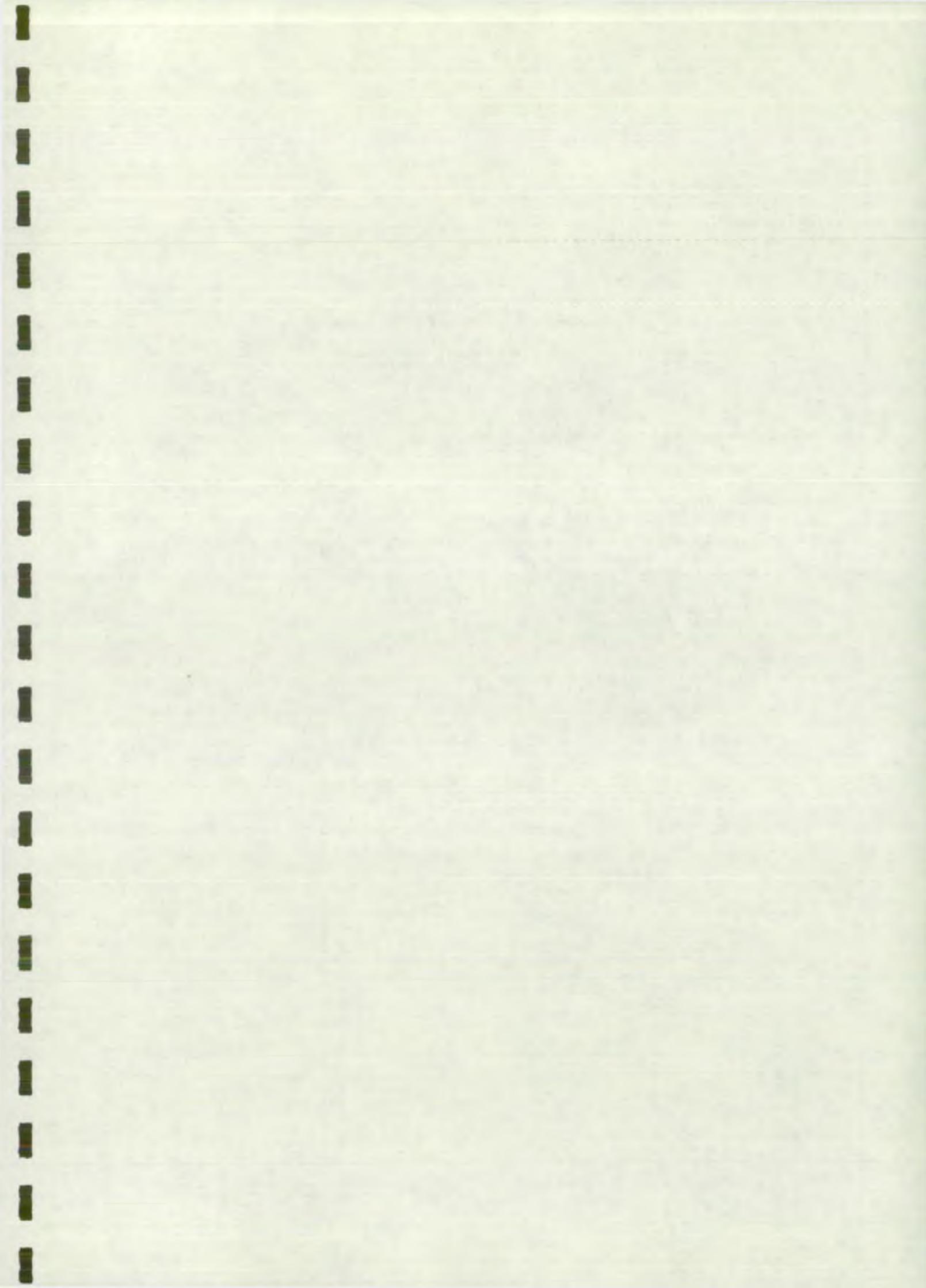
In prehistoric times the area was covered by dense, wet and inhospitable woodland and it was not until the late Bronze Age that some clearance was attempted. The Romans occupied the area but it was not until around the Doomsday period that large areas of woodland were cleared and wealth began to be built.

Manchester Conurbation

The area is a densely built up low-lying basin. However, the corridor surrounding the River Mersey forms a distinctive and sometimes quite wide area of open land. Some of the area is farmed but much of it is occupied by water parks flood basin, golf courses and informal parkland as well as derelict land that is naturally regenerating.

Mersey Valley

The area of the Mersey Valley within our study area is an undulating valley side that slopes gently to the old flood plain of the River Mersey. Around the Carrington area the land is flat and was once occupied by large expanses of raised bogs or mosses. These have now been drained and the rich peaty soil turned over to intensive arable farming. However, this is a very urban area with large chemical and other industrial plants dominating large areas.



Mersey/Bollin Local Environment Agency Plan
Map 21



1.13 Landscape and Heritage

The area was once a frontier between English Mercia and Danish Northumbria and has a long history of settlement. However, most of the old patterns have now disappeared under modern development.

The River Landscape

The two principal rivers the Mersey and the Bollin have markedly different landscape characters. The Bollin runs through a small but steep sided valley in a mainly rural setting. In many areas it can still meander in a relatively natural way. The Mersey on the other hand is a large slow flowing river that meanders across the bottom of a wide and gently sloping valley. It is heavily urbanised and has had its course fixed and enclosed by large flood embankments. Numerous weirs have reduced its energy and is now a heavily modified and degraded river system with few natural features and habitats left. This contrast is reflected in a landscape assessment recently carried out by the Environment Agency. In this assessment 97% of the Mersey's river channel was found to have a weak and degraded character in need of extensive enhancement. Whereas only 4% of the Bollin's river channel needed enhancement. A quarter of it needed some restoration of its character while the remaining channel had a strong and well developed character that only needed conserving. See Map 21.

Mineral Extraction

Coals within the Carboniferous sequence have been worked in the past by underground methods around Poynton, and the hard sandstone layers have been quarried for building and decorative stone, and aggregate east of Macclesfield.

Some sand and gravel extraction has taken place, but not on the scale of elsewhere on the Cheshire plain.

The Boulder Clay has been dug for brick manufacture; works at Cheadle are still operational.

1.14 Development

Links between LEAPs and Development Plans

The links between development plans and LEAPs are most important and the recognition of LEAPs in development plan preparation is essential. LEAP information and issues can have an impact on future land use planning and achieving the objective of sustainable development.

Sustainable development is one of the major challenges facing society today. The Government is currently pursuing a number of initiatives that will incorporate the principles of sustainable development more firmly into the planning system. This includes a wider role for Regional Planning Guidance (RPG), to produce a more comprehensive 'spatial' strategy designed to balance needs for development with the need to protect the environment and achieve social and economic objectives. A sustainability appraisal will be integral to the RPG process. The RPG is translated at a local level through development plans. From now on, development plans have to incorporate sustainable development objectives. The good practice guide *Planning for Sustainable development: Towards Better Practice, DETR 1998* suggests a systematic method to assist Local Planning Authorities (LPAs) in integrating sustainable development into their development plans. As part of this, the longer term and secondary effects of development need to be recognised. The methodology puts forward aims to place sustainable development at the heart of plan preparation, and integrates it into each stage of the process, resulting in greater emphasis on identifying objectives and indicators as a basis for subsequent monitoring.

The good practice guidance states that planners in all circumstances should be aiming to:

- avoid dangerous interference with the **climate system**;
- protect and improve the **quality of air, soil and water**;
- minimise the **use of resources** (eg land, building materials, water);
- protect and enhance the **built heritage**; and
- conserve the **diversity of species and habitats**.

For a Better Environment Through Partnership Section

The Environment Agency takes a pro-active role in the land-use planning system. We published our national document *Liaison with LPAs March 1997*. The document explains our role and contribution to the land use planning system.

Past development has had a major influence on shaping the area and the planning system plays an important role in protecting much of its special character. New development has to be carefully considered to recognise both potential adverse effects, as well as the benefits, change can have on the environment. We consider LEAPs are an important part of the on-going dialogue with LPAs to foster partnerships and identify issues, where environmental problems and potentials can be most actively pursued.

1.14 Development

Local Perspective - Links between LEAPs and Land use Planning

Planning policy within the Plan area is guided by Regional Planning Guidance (RPG) for the North West Note 13, April 1996. This sets the strategic planning framework for the area, highlighting development pressures and the development framework for such issues as the Environment, the Economy and Housing etc.

The plan area in planning terms is administered by a number of Councils (See Map 22). These are:

Councils in LEAP Area

Tameside MBC
Stockport MBC
Trafford MBC
Manchester City Council (MCC)
Macclesfield BC
Warrington BC
Cheshire CC

The Area is contained within parts of Greater Manchester, and Cheshire.

Each of the LPAs is in the process of preparing, or has in place a development plan. Due to the Plan boundary being based on a catchment boundary no Council is wholly contained within this plan area.

Planning Policy is playing an important role in bringing about urban regeneration and environmental improvements. Green Belt Policy separates the main towns from merging and supports regeneration. The river valleys are important areas of open land with landscape character. These areas are protected by the emerging development plans. Derelict land is still a major problem which needs to be addressed through various partnerships.

The Agency supports development plan policies and actions by LPAs which will protect and enhance the environment in accordance with our aims and objectives.

Table 11 indicates the current state of development plan preparation within the area. This table highlights LPA development plan policies which we feel protect our interests. There will be a further opportunity for the LPAs to highlight which will support actions in this LEAP and potential areas for enhancement.

From the above, the Agency will seek to ensure the following policy objectives will be translated into all land-use planning policy.

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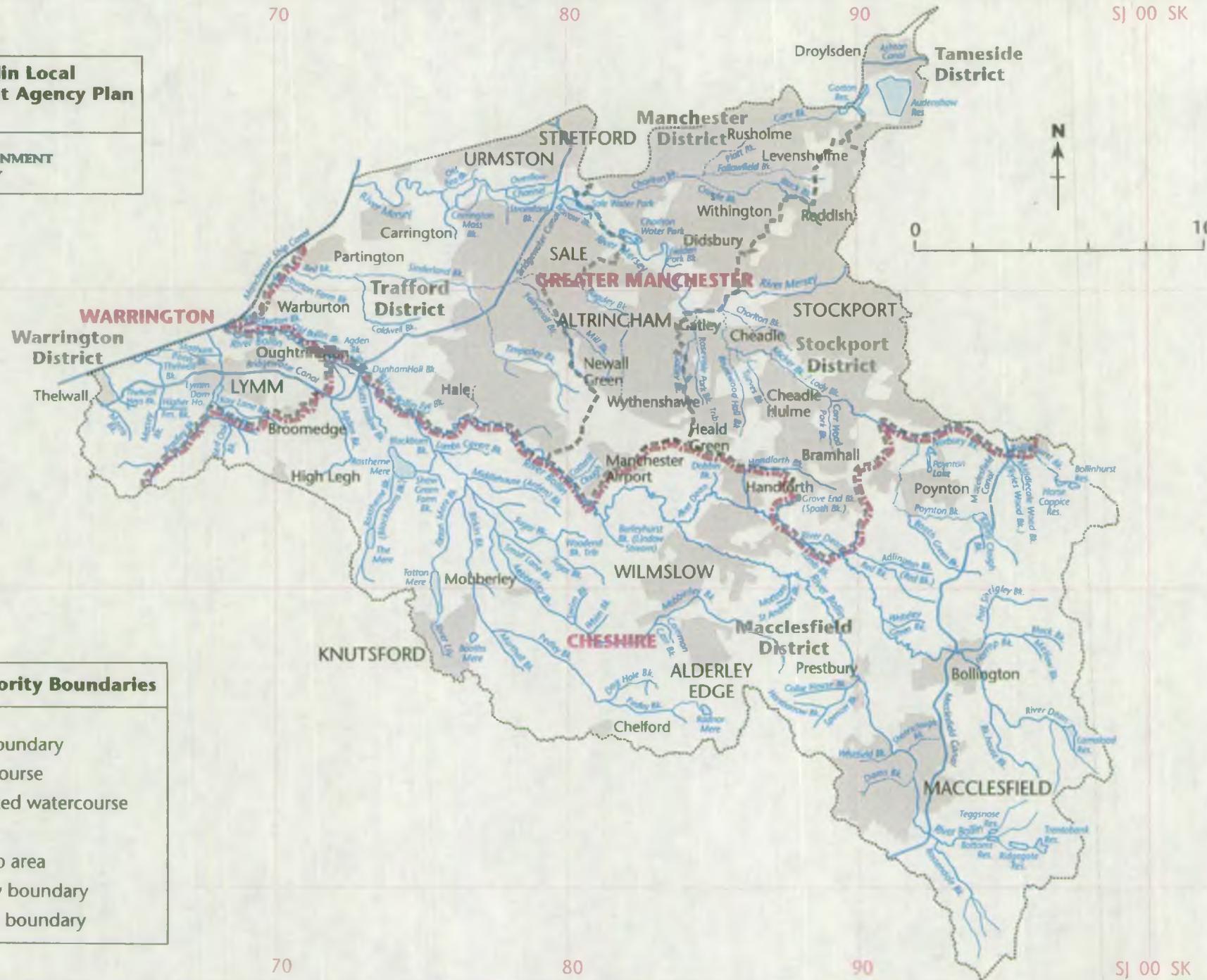
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**Mersey/Bollin Local Environment Agency Plan
Map 22**



ENVIRONMENT
AGENCY



Local Authority Boundaries

KEY

- Area boundary
- Watercourse
- Culverted watercourse
- Canal
- Built up area
- County boundary
- - - District boundary

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70

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SJ 00 SK

1.14 Development

Development Policy Objectives.

Integrated River Basin Management

a) Flood Defence

To discourage new buildings and land raising in areas at risk from flooding or where development could cause flooding elsewhere:

- by encouraging the protection of watercourses so they can fulfil their principal functions and contribute beneficially to the environment;
- by encouraging continuous unobstructed areas adjacent to watercourses to ensure access for essential maintenance or flood flows;
- by encouraging the protection of existing flood defences to prevent interference with the ability of the Agency and other bodies to carry out flood control works and maintenance activities;
- by highlighting where surface water storage or regulation may be necessary for catchments where increased rates and volumes of surface water run-off could cause or exacerbate flooding problems;
- by encouraging the protection and where necessary, restoring effective flood flow conveyance and flood water storage capacities of floodplains.

b) Water Quality

To protect and improve the quality of surface waters and groundwaters:

- by ensuring new development complies with the Policy and Practice for the protection of Groundwater;
- by ensuring development does not cause water pollution via discharge points and new development is served by satisfactory arrangements for the disposal of foul sewage, trade effluent and contaminated surface water;
- by encouraging, where there are sewage treatment capacity problems causing premature and high frequency overflows, new development to be phased to coincide with improved infrastructure;
- by ensuring appropriate development complies with the Control of Pollution (Silage, Slurry, Agricultural Fuel Oil) Regulations 1991 and the MAFF Codes of Good Agricultural Practice for the Protection of water, soil and air;

1.14 Development

- by ensuring leachate and drainage is controlled and monitored from contaminated land sites;
- by ensuring surface water disposal systems are protected, maintained and wrong connections are avoided.

c) Managing our Water Resources

To protect and manage the amount of surface water and groundwater resources to achieve the right balance between the needs of the environment and those of abstractors:

- by promoting the incorporation of suitable water efficiency measures;
- by ensuring development can be or will be served by an adequate means of water supply which will not adversely affect existing users, river flows, water quality, agriculture, fisheries, amenity or nature conservation.

d) Biodiversity and Enhancement of the Water Environment

To protect, conserve and enhance areas of aquatic value and other important elements of the water environment:

- by highlighting the areas of the water environment, including river corridors which are, or have the potential to be of value;
- by discouraging development which would have an adverse impact on the nature conservation, landscape, heritage, fisheries, recreation or amenity value of watercourses, ponds and wetlands or on the land physically and visually linked to them;
- by siting development away, wherever possible, from river corridors;
- by seeking to ensure development proposals protect and enhance on-site aquatic features and where development is accepted because of overriding economic or social considerations, mitigation and compensatory measures are provided, to ensure that there is no net loss of environmental value.
- by encouraging, where opportunities arise, the restoration of river corridors which have been degraded by past development.

e) Conserving the land - Waste Disposal, Mineral Operations and Contaminated Land Sites

To ensure waste disposal, mineral operations and contaminated land redevelopment does not cause pollution or harm to human health:

1.14 Development

- by ensuring where schemes are not controlled by the Environmental Protection Act 1990, adequate measures will be implemented to control and monitor water pollution and landfill gas;
- by encouraging compliance with the Government's National Waste Management Strategy;
- by encouraging the re-use of contaminated land sites where the degree and nature of the contamination has been assessed and appropriate measures to protect the environment incorporated.

f) Improving Air Quality and addressing climate change

To protect air quality:

- by ensuring certain development processes where schemes are not controlled by the Environmental Protection Act 1990 will not have an adverse effect on air quality.

1.14 Development

Table 11

LPA Plan Policies which aim to protect the environment (their plan policy reference shown)										
Development Plan Name & Status	Air, Water Quality & Water Resources			Flood Defence	Fisheries, Recreation & Conservation			Minerals, Waste Disposal & Contaminated Land		
Tameside MBC Adopted UDP September 1996	G5 M18 M22			M28	C33 OL15 17 18 21			M19 M20 M1 M3 M4 M15		
Stockport MBC Adopted UDP February 1998	UN8.3 UN8.5			UN8.7	UC3			UM1.1 1.2 2.1		
Macclesfield BC Adopted Local Plan December 1997	DC17 18 20 21			DC19	N10			N/A		
Trafford MBC Adopted UDP May 1996	ENV30 31 32			ENV12	ENV6 7 29 OSR14 15			ENV33 M4 WD3 WD4 WD5		
Manchester MCC Adopted UDP July 1995	E3.4c			DC21.1	E3.6c E2.3 E3.4 E2.4			DC27.2b DC27.3b DC28.11d DC28.1g DC28.9b(iii) & (viii)		
Warrington BC Post Deposit Local Plan following public inquiry	DC1 2 ENV20 22 23 24 25			ENV10 11	ENC1 5 15 16 17			ENV18 19		

Appendices

Appendix 1 – Glossary

ABSTRACTION LICENCE

A licence to abstract water issued by the Agency. The maximum annual, daily, and hourly abstraction rates are normally set within the terms of the licence.

AQUIFER (see MAJOR AQUIFER)

A layer of underground porous rock, which contains water and allows water to flow through it.

BIOACCUMULATIONS

The process by which a compound is taken up by an aquatic organism from water or through food and retained.

CHANNEL

A cutting in land along which a watercourse flows.

COMPENSATION WATER

Water released from a reservoir to maintain the flow required in the river.

CONFLUENCE

Point where two, or more, rivers meet.

CONTROLLED WASTE

Household, commercial or industrial waste from a house, school, university, hospital, residential or nursing home, shop, office, factory or any other trade or business. It may be solid or liquid, but not necessarily hazardous or toxic.

CULVERT

Covered channel or large pipe to carry water below ground level e.g. under a road, railway or building.

CYPRINIDS

The carp family of fish comprising some 200 freshwater species.

DEPOSITION

Where a river flows more slowly it may deposit gravel, sand and silt in its channel - often on the inside edge of bends or meanders.

Appendix 1 – Glossary

DIFFERENT UNITS FOR FLOW MEASUREMENT

m^3/s	Cubic metres per second (cumec)
l/s	Litres per second
Ml/d	Megalitres per day
mgd	Millions of gallons per day

Conversion Table

m^3/s	Ml/d	mgd
0.016	1	0.220
0.08	5	1.10
0.116	10	2.20
0.32	20	4.48
0.58	50	11.0
1.16	100	22

DRIFT

Superficial deposits covering solid rock. Often deposited by rivers or by former glaciation in the form of boulder clay, peat or sands and gravels.

EUTROPHICATION

Enrichment of water by nutrients causing an accelerated growth of algae and higher forms of plant life to produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned.

FAUNA

Animal life.

FLUVIAL

Adjective of rivers.

FRESHWATER FISH

For the purpose of the Salmon and Freshwater Fisheries Act 1975, fish other than salmon, brown trout, sea trout, rainbow trout and char.

Appendix 1 – Glossary

GEOMORPHOLOGICAL FEATURES

Physical features of a river, which include meandering (winding) channel, gravel beds and shoals, ox-bows, earth cliffs and river terraces.

HYDRAULIC CONTINUITY

The relationship between groundwater and surface water flow.

INCINERATION

Consume by fire and reduce to ashes.

Specialist high temperature incineration is the best option for many hazardous wastes, but for household and similar wastes, the main advantage is volume reduction. Expensive, but the heat may be recovered as an energy source.

INDICATIVE STANDARDS

Ministry of Agriculture, Fisheries and Food defined standards of flood protection according to current land use.

INVERTEBRATE

Animal without a backbone for example insects.

LANDFILL

The deposit of waste into or onto land, which can then be restored to some other use. The predominant method for the disposal of controlled waste in the UK.

LANDFILL GAS

Gas arising from the natural biological degradation of organic materials in landfill. It consists mainly of methane and carbon dioxide and can cause problems such as damage to crops and vegetation, and hazards such as risk of asphyxiation or explosion in confined spaces. Landfill gas may however be exploited as an energy source.

LANDFILL TAX

Introduced in October 1996, a tax paid by landfill operators to ensure that landfill costs reflect environmental impact, thereby encouraging waste reduction, reuse and recovery

LEACHATE

Liquid containing material in solution, draining from the ground.

Appendix 1 – Glossary

LOAD

A measure of the material carried by a river either in suspension or as dissolved material.

MAIN RIVER

Some, but not all, watercourses are designated as Main River. Main River status of a watercourse must first be approved by MAFF. The Environment Agency has the power to carry out works to improve drainage or protect land and property against flooding on watercourses designated as Main River.

MAJOR AQUIFER

Water bearing rocks, which are capable of yielding significant volumes of groundwater due to their high permeability and porosity.

MARGINAL

At the water's edge

MESOTROPHIC

Water body containing a medium amount of nutrients e.g. nitrogen or phosphorus.

MINOR AQUIFER

Water bearing rock of limited extent, capable of supporting medium/small abstractions.

NON AQUIFER

Rock of low permeability containing little or no groundwater (may support very limited abstractions).

NON REAL TIME

Monitoring results, which are available at a date later than when the sampling took place.

OCHRE

Iron based orange discolouration.

PASTURE

Semi-improved and improved grazed grassland.

Appendix 1 – Glossary

POOL

A deep, slow, flowing section of a river or stream.

PRECIPITATION

The total amount of water, which falls as rain, hail, or snow, expressed as mm or inches of rainfall over a specified period.

PRODUCER RESPONSIBILITY

A business-led approach, which may be underpinned by legislation, to achieve the reuse, recovery and recycling of waste.

REAL TIME

Monitoring results, which are available, when the sampling takes place.

RETURN PERIOD

The frequency within which, on average, an event of a certain severity may be expected to return (expressed in years).

REVETMENT

Regularly sized and shaped stones, timber or concrete blocks placed in an ordered fashion.

RIFFLE

A shallow, but fast flowing part of a river or stream.

RIPARIAN

Of, or on, the banks of a river.

RIPARIAN OWNER

Owner of land abutting a river or lake. Normally riparian owners own the bed of river to the mid point of the channel.

RIVER CORRIDOR

Stretch of river including its banks and the land close by.

SALMONIDS

Fish classified as belonging to the Salmon family, such as Salmon, Trout and Char.

Appendix 1 – Glossary

SHOAL

A sand and/or gravel deposit at the edge of or within river channel.

SPECIAL WASTE

A strictly defined group of controlled wastes, which are considered to be particularly dangerous or difficult, usually by virtue of hazard or toxicity, and therefore subject to additional controls.

STRATA

Layers of rock.

SPATE

Very high flows, usually associated with rainstorms which may cause flooding. Spate flows naturally cleanse the river channel.

TOPOGRAPHY

Physical features of a geographical area.

TRANSFER STATION (Waste Disposal)

A licensed depot where controlled waste is stored and sorted for disposal or recycling.

TREATMENT

The physical, chemical or biological processing of certain wastes to reduce volume or pollution potential before recovery or disposal.

WASTE MINIMISATION

Reducing the quantity and/or hazard of waste produced.

WATER TABLE

The surface of a body of groundwater within the underground strata. The water table will fluctuate as a result of natural or artificial causes.

Appendix 2 – Abbreviations

AOD	-	Above ordnance datum
ADAS	-	Agricultural Development Advisory Service
AMP	-	Asset Management Plan
BOD	-	Biochemical Oxygen Demand
CMP	-	Catchment Management Plan
CSO	-	Combined Sewer Overflow
CSW	-	Contaminated Surface Water
DETR	-	Department of the Environment, Transport and the Regions
GDO		General Development Order
EC	-	European Commission
EO	-	Emergency Overflow
ESA	-	Environmentally Sensitive Area
EQS	-	Environmental Quality Standard
FWAG	-	Farming and Wildlife Advisory Group
GMEU	-	Greater Manchester Ecology Unit
GQA	-	General Quality Assessment
IFE	-	Institute of Freshwater Ecology
IPC	-	Integrated Pollution Control
LBAP	-	Local Biodiversity Action Plan
LPA	-	Local Planning Authority
MAFF	-	Ministry of Agriculture Fisheries and Food
NFU	-	National Farmers Union
NWW Ltd	-	North West Water Limited
OFWAT	-	Office of Water Services

Appendix 2 – Abbreviations

PAH	-	Polycyclic aromatic hydrocarbons
QLS	-	Quality Survey Limit
RE	-	River Ecosystem
RHS		River Habitat Survey
RQO	-	River Quality Objective
SBI	-	Site of Biological Importance
SCA		Supplementary Credit Approval
SPA		Special Protection Area
SSSI	-	Site of Special Scientific Interest
SWQO	-	Statutory Water Quality Objectives
UDP	-	Unitary Development Plan
WML	-	Waste Management Licence
WwTW	-	Wastewater Treatment Works

Appendix 3 – River Quality Objectives (RQOs)

The Agency has proposed strategic targets for water quality in all classified watercourses known as River Quality Objectives (RQOs). These provide a basis for taking management decisions to protect and improve the chemical quality of these watercourses.

Ultimately RQOs for different water uses will be set, however, currently only the River Ecosystem (RE) scheme has been developed. This sets standards relating to the chemical quality requirements for different aquatic ecosystems. Details of the required standards are contained in Table 1.

Short-term RE objectives are proposed, along with a date by which compliance will be achieved. These objectives must be achievable within a ten-year horizon of committed investment or by the actions of the Agency or others. Long-term RE objectives are also proposed which reflect the achievable aspirations for the water quality. Achievement of these objectives may take more than ten years and require currently uncommitted expenditure. A list of all the proposed RQOs for the Manchester City Council area is contained in Table 2.

The Agency seeks views from interested parties on the proposed short and long-term objectives during its Local Environment Action Plan (LEAP) consultation process. Where justifiable reasons exist, objectives may be amended during the annual review process. These objectives may be made statutory by direction of the Secretary of State but the timescale for implementation is uncertain at this time.

Appendix 3 – River Quality Objectives (RQOs)

Table 1: River Ecosystem RQOs – Water Quality Criteria

Class	Dissolved Oxygen (%sat) 10-percentile	BOD (mg/l) 90-percentile	Ammonia (mg/l as N) 90-percentile	Un-Ionised Ammonia (mg/l as N) 95-percentile	pH lower limit 5-percentile upper limit 95-percentile	Hardness CaCO ₃ (mg/l)	Dissolved Copper (µg/l) 95-percentile	Total Zinc (µg/l) 95-percentile
RE1	80	2.5	0.25	0.021	6 - 9	<10 >10 & <50 >50 & <100 >100	5 22 40 112	30 200 300 500
	Water of very good quality (suitable for all fish species)							
RE2	70	4	0.6	0.021	6 - 9	<10 >10 & <50 >50 & <100 >100	5 22 40 112	30 200 300 500
	Water of good quality (suitable for all fish species)							
RE3	60	6	1.3	0.021	6 - 9	<10 >10 & <50 >50 & <100 >100	5 22 40 112	300 700 1000 2000
	Water of fair quality (suitable for high class coarse fish populations)							
RE4	50	8	2.5	-	6 - 9	<10 >10 & <50 >50 & <100 >100	5 22 40 112	300 700 1000 2000
	Water of fair quality (suitable for coarse fish populations)							
RE5	20	15	9.0	-	-	-	-	-
	Water of poor quality (which is likely to limit coarse fish populations)							

No Class: **Water of bad quality (in which fish are unlikely to be present)**

Appendix 3 – River Quality Objectives (RQOs)

Table 1 – River Quality Objectives (RQOs)

River	Stretch	Length (km)	Short Term RE RQO	Long Term RE RQO
Mersey	Princess Parkway to Carrington PS	17.6	RE5 (1999)	RE3
Mersey	Stockport STW to Princess Parkway	8.9	RE5 (1999)	RE3
Mersey	Goyt/ Tame Conf. To Stockport STW	3.7	RE4 (1999)	RE3
Sow Brook	QSL at Lymm Dain to MSC	2.1	RE4 (1999)	RE3
Bollin	Pedley (Birkin) Bk to MSC	9.9	RE4 (1999)	RE3
Bollin	Dean to Pedley (Birkin) Brook	17.7	RE4 (1999)	RE3
Bollin	Macclesfield STW to Dean	8.9	RE4 (1999)	RE3
Bollin	Weir at SJ 903 760 to Macclesfield STW	3.5	RE4 (1995)	RE3
Bollin	Macclesfield Stn to Weir at SJ 903 760	3.5	RE4 (1999)	RE3
Bollin	Dane Moss Trib to Macclesfield Stn	1.7	RE4 (1995)	RE3
Bollin	QSL at Langley to Dane Moss Trib	3	RE2 (1995)	RE2
Agden Brook	QSL at A56 to Bollin	2.1	RE5 (1999)	RE3
Birkin Brook	Mobberley Brook to Bollin	3.4	RE3 (1999)	RE2
Mobberley Brook	Mobberley STW to Birkin Brook	4.4	RE5 (1995)	RE3
Mobberley Brook	QSL Alderley Edge STW to Mobberley STW	6	RE5 (1995)	RE3
Blackburn Brook	Little Mere Outlet to Birkin Brook	4.1	RE4 (1995)	RE2
Rostherne Brk	QSL at Mere to Little Mere Outlet	1.1	RE5 (1995)	RE2
Birkin Brook	Tatton Mere Stream to Mobberley Brook	0.7	RE3 (1995)	RE2
Birkin Brook	Knutsford STW to Tatton Mere Stream	3.8	RE3 (1995)	RE2
Birkin Brook	Marthall Brook to Knutsford STW	1.6	RE4 (1999)	RE2
Pedley Brook	QSL at Peckmill Bottoms to Marthall Bk	5.5	RE4 (1999)	RE2
Tatton Mere Stream	QSL at head of Tatton Mere to Birkin Brook	4.7	RE2 (1999)	RE2
Marthall Brook	QSL at Marthall Lane to Pedley Brook	2.2	RE3(1995)	RE2
Sugar Brook	QSL at Hargreaves Bridge to Mobberley Brook	4.8	RE3 (1999)	RE2
Cotterill Clough	QSL at Ringway to Bollin	1.4	RE4 (1999)	RE4
Dean	Wilmslow STW to Bollin	0.3	RE5 (1999)	RE3
Dean	Rainow STW to Wilmslow STW	18.5	RE2 (1995)	RE2
Dean	QSL at Lamaload Resvr. To Rainow STW	4.2	RE2 (1995)	RE2
Spath Brook	QSL at Stanley Green IE to Dean	1.4	RE4 (1999)	RE3
Red Brook	Shirdfold Farm Stream to Dean	0.6	RE5 (1999)	RE2
Red Brook	QSL Redbrook Bridge to Shirdfold Farm Stream	1.6	RE3 (1999)	RE2
Harrop Brook	QSL at Bowerclough to Dean	2.8	RE2 (1995)	RE2

Appendix 3 – River Quality Objectives (RQOs)

River	Stretch	Length (km)	Short Term RE RQO	Long Term RE RQO
Pott Shrigley Brook	QSL at Industrial Estate to Harrop Brook	2.2	RE2 (1995)	RE 2
Shawclough Brook	QSL at Hurdsfield IE to Bollin	1.1	RE5(1995)	RE3
Rossendale Brook	QSL at Lowerhouse to Bollin	2.5	RE3 (1999)	RE3
Sinderland Brook	Altrincham STW to MSC	5.9	RE5 (1995)	RE4
Sinderland Brook	Fairywell Brook to Altrincham STW	3.4	No short term RE RQO	RE3
Sinderland Brook	QSL at Portway to Fairywell Brook	7.6	RE4 (1999)	RE3
Timperley Brook	QSL at Wellfield Lane to Sinderland Brook	4.5	RE4 (1999)	RE3
Fairywell Brook	QSL at Whitecarr Lane to Sinderland Brook	4.3	RE3 (1999)	RE3
Old Eea Brook	QSL at SJ 7692 9423 to Mersey	1.7	RE5 (1999)	RE4
Stromford Bk	QSL at Sale WwTW to Mersey	0.9	RE5(1999)	RE4
Chorlton Brook	Cringle brook to Mersey	4.5	RE3 (1995)	RE3
Chorlton Brook	QSL at Tanyard Brow to Cringle Brook	5.9	RE3 (1995)	RE3
Cringle Brook	QsL at Heaton Chapel to Platt Brook	4.8	RE3 (1995)	RE3
Fallowfield Brook	QSLat North Reddish to Chorlton Brook	4.7	RE5 (1999)	RE4
Gatley Brook	QSL at Heald Green Station to Mersey	4.2	RE3 (1999)	RE2
Micker Brook	Poynton Brook to Mersey	10.1	RE3 (1999)	RE2
Micker (Norbury) Brook	QSL at Norbury Hollow to Poynton Brook	2.8	RE3 (1995)	RE2
Poynton Brook	QSL at Poynton Bridge to Micker Brook	3.3	RE3 (1995)	RE2
Bridgewater Canal	Lymm (A6144) to Waters Meetings	18.5	RE3 (1999)	RE3
Ashton Canal	Peak Forest Canal to Robertsons	3.6	RE3 (1999)	RE2
Macclesfield Canal *	QSL at Peak Forest to Cowley	24.3	RE4 (1995)	RE4

* This stretch is included in the Tame/Goyt/Etherow LEAP and is reported here only for information.

Appendix 3 – River Quality Objectives (RQOs)

Table 2 Changes to Proposed Short Term River Ecosystem RQOs

River	Stretch	Previous Short Term RE RQO	Revised Short Term RE RQO	Reason for Change
Mersey	Princess Parkway to Carrington PS	RE4 (1995)	RE5 (1999)	Previous data was unrepresentative. Current data indicates that RE4 can not be consistently achieved in the short term.
Mersey	Stockport STW to Princess Parkway	RE4 (1995)	RE5 (1999)	Review of data. Current data indicates that RE4 can not be consistently achieved in the short term.
Mersey	Goyt/ Tame Confluence to Stockport STW	RE3 (1995)	RE4 (1999)	Previous data was unrepresentative.
Sow Brook	QSL at Lymm Dam to MSC	RE3 (1995)	RE4 (1999)	RE3 is not perceived as consistently achievable.
Bollin	Pedley to Manchester Ship Canal	RE2 (2001)	RE4 (1999)	Review of data.
Bollin	Dean to Pedley (Birkin) Brook	RE3 (1995)	RE4 (1999)	Review of data.
Bollin	Macclesfield STW to Dean	RE3 (1995)	RE4 (1999)	RE3 is not perceived as consistently achievable.
Bollin	Weir at SJ903 760 to Macclesfield STW	RE3 (1995)	RE4 (1999)	RE3 is not perceived as consistently achievable.
Agden Brook	QSL at A56 to Bollin	RE4 (1995)	RE5 (1999)	Review of data.
Rostherne Brook	QSL at Mere to Little Mere Outlet	RE4 (1995)	RE5 (1999)	Review of data. Current data indicates that RE4 can not be consistently achieved in the short term, unknown sources.
Birkin Brook	Marthall Brook to Knutsford STW	RE3 (1995)	RE4 (1999)	Review of data has indicated that RE3 can not be consistently achieved in the short term.
Pedley Brook	QSL at Peckmill Bottoms to Marthall Brook	RE3 (1995)	RE4 (1999)	Review of data has indicated that RE3 can not be consistently achieved in the short term.
Tatton Mere Stream	QSL at head of Tatton Mere Stream to Birkin Brook	RE3 (1995)	RE2 (1999)	Review of data.
Sugar Brook	QSL at Hargreaves Bridge to Mobberley Brook	RE2 (1995)	RE3 (1999)	Review of data indicates that RE2 is not consistently achievable.

Appendix 3 – River Quality Objectives (RQOs)

River	Stretch	Previous Short Term RE RQO	Revised Short Term RE RQO	Reason for Change
Dean	Wilmslow STW to Bollin	RE3 (1995)	RE5 (1999)	Review of data.
Spath Brook	QSL at Stanley Green IE to Dean	RE5 (1995)	RE4 (1999)	Changed to reflect recent improvements in the water quality.
Red Brook	Shirdfold Farm Stream to Dean	RE2(2001)	RE5(1999)	Review of data. RE2 is not achieveable in the short term.
Red Brook	QSL Redbrook Bridge to Shirdfold Farm Stream	RE2 (1995)	RE3 (1999)	Review of data. RE2 is not consistently achievable.
Rosendale Brook	QSL at Lowerhouse to Bollin	RE4 (1996)	RE3 (1999)	Changed to reflect improvements in water quality.
Sinderland Brook	Fairywell Brook to Altrincham STW	RE5 (1995)	No short term RQO	Review of data. Indications that RE5 cannot be consistently achieved in the short term.
Fairywell Brook	QSL at Whitecart Lane to Sinderland Brook	RE4 (1995)	RE3 (1999)	Review of data indicates RE3 consistently achievable.
Old Eea Brook	QSL at SJ 7692 9423 to Mersey	No short term RQO	RE5 (1999)	Review of data indicates RE5 is now consistently achievable.
Fallowfield Brook	QSL at North Reddish to Chorlton Brook	RE3 (1995)	RE5 (1999)	Review of data, unknown sources restricting water quality to RE5 consistently.
Gatley Brook	QSL at Heald Green Station to Mersey	RE5 (1995)	RE3 (1999)	Review of data, recognising significant improvements in water quality.
Micker Brook	Poynton Brook to Mersey	RE2 (1995)	RE3 (1999)	Recognising that RE3 is more sustainable for the urban catchment.
Bridgewater Canal	Lymm (A6144) to Waters Meeting	RE2 (1995)	RE3 (1999)	Review of data. Recognising that RE2 is not consistently achievable.
Ashton Canal	Peak Forest Canal to Robertsons	RE2 (1995)	RE3 (1999)	Review of data indicates RE2 not consistently achievable in the short term.

Appendix 3 – River Quality Objectives (RQOs)

Table 3 Changes to Proposed Long Term River Ecosystem RQOs

River	Stretch	Previous Long Term RE RQO	Revised Long Term RE RQO	Reason For Change
Mersey	Princess Parkway to Carrington PS	RE4	RE3	RE3 perceived as achievable in the long term.
Mersey	Stockport STW to Princess Parkway	RE4	RE3	RE3 perceived as achievable in the long term.
Bollin	Pedley (Birkin)Brook to MSC	RE2	RE3	Review of data and nature of catchment. RE2 not perceived as a consistently achievable objective.
Mobberley Brook	Mobberley STW to Birkin Brook	RE2	RE3	Review of nature of the catchment indicates that RE2 is unlikely to be achieved consistently.
Mobberley Brook	QSL Alderley Edge STW to Mobberley Brook	RE4	RE3	Consistent with short-term objective of RE3 after AMP3 improvements.
Spath Brook	QSL at Stanley Green IE to Dean	RE4	RE3	RE3 is perceived as an achievable objective in the long term.
Shawclough Brook	QSL at Hurdsfield IE to Bollin	RE4	RE3	RE3 is perceived as an achievable objective in the long term.
Sinderland Brook	Fairywell Brook to Altrincham STW	RE4	RE3	RE3 is perceived as an achievable objective in the long term.
Sinderland Brook	QSL at Portway to Fairywell Brook	RE4	RE3	RE3 is perceived achievable objective in the long term.
Timperley Brook	QSL at Wellfield Lane to Sinderland Brook	RE4	RE3	RE3 is perceived as an achievable objective in the long term.
Fairywell Brook	QSL at Whitecarr Lane to Sinderland Brook	RE4	RE3	RE3 is perceived as an achievable objective in the long term.
Fallowfield Brook	QSL at North Reddish to Chorlton Brook	RE3	RE4	Review of data indicates that this highly urban stream is unlikely to achieve RE3.
Bridgewater Canal	Lymm (A6144) to Waters Meeting	RE2	RE3	Review of data indicates that this stretch is unlikely to achieve RE2.

**NORTH WEST
ENVIRONMENT AGENCY
PUBLICATION LIST**

**Last Updated January 2000
(Latest Publications shown in italics)**

Head Office/Corporate Publications
Environmental Challenge Calendar 2000-Are you doing your bit?
<i>Environment Agency Postcards (x4 Designs)</i>
River Life-Source to Sea
<i>State of the Environment-Freshwaters</i>
<i>Managing water resources – Out of Stock</i>
<i>Integrated river-basin management – Out of stock</i>
<i>Conserving the land – Out of Stock</i>
<i>Managing Freshwater Fisheries</i>
<i>Enhancing Biodiversity</i>
<i>Regulating Industry</i>
<i>Addressing Climate Change</i>
<i>State of the Environment-Coasts</i>
State of Environment in England and Wales
Current R&D-Structure and objectives for 2000/2001 R&D Programme
R & D Strategy
<i>Public Access to Environmental Information</i>
Public Registers of Environmental Information
Charging for Information
<i>Oil and Gas in the Environment-Summary Report</i>
<i>Enforcement and Prosecution Policy</i>
Complaints and commendations procedure
Environmental Policy Statement
Annual Report and Accounts 1998-1999
Annual Review 1998-1999
Corporate Plan Summary 2000-2001
North West Regional Annual Committees' Report 1998/99
Corporate Plan 2000-2001
Environmental Strategy for Millennium and Beyond
Making a fresh start for the environment in 2000
Customer Charter
Sustainable Development Guidance Notes

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<i>SD1 - Introductory Guidance on the Agency's Contribution to Sustainable Development</i>
<i>SD2 – The Agency's Conservation Duties-November 1996</i>
<i>SD3 – Taking Account of Costs and Benefits - November 1996</i>
<i>SD4 – Rural Communities – March 1998</i>
<i>SD5 – Sustainability examples from the USA and Canada – June 1997</i>
<i>SD6 – The Agency's Contribution to Sustainable Development – Waste Minimisation – June 1997</i>
<i>SD7 – A strategy for Implementing the EA's contribution to UK Biodiversity Action Plan August 1997</i>
<i>SD8 – Conservation Designations – February 1998</i>
<i>SD9 – The Agency's contribution to Sustainable Development – Case studies – October 1997</i>
<i>SD10-Guidance on the Agency's involvement in the administration of EC structural Funds</i>
<i>SD11-Resource Demand Management- March 1998</i>
<i>SD12-Consensus Building for Sustainable Development – March 1998</i>
<i>Annual Report of Environment Agency Environmental Activities-Summary (1998-99)</i>
<i>Annual Report of Environment Agency Environmental Activities-Full Report (1998-99)</i>
<i>Better Environment for England and Wales</i>
<i>Education Resources for Schools/ CREST – Environmental Research Challenge</i>
<i>Where you can find us-List of Environment Agency Offices by Region and Area</i>
North West Specific Publications
<i>North West Environmental Statistics 1997-1998</i>
<i>The Radiological Implications of Contaminated Feral Pigeons found at Sellafield and Seascale</i>
<i>Local Environment Agency Plans – North West</i>
<i>Who's Who in North West</i>
<i>Regional Review and Forward Look – North West</i>

River Factfiles
Alt; Derwent; Douglas; Eden; Irwell; Kent; Mersey; Ribble; Weaver; Wyre

Conservation/Fisheries and Recreation
<i>Safe Waters-Using antifouling paints safely-A guide for private boat owners</i>
<i>Golden Rules-Angling and Wildlife</i>
<i>Environmental Good Practice-Urban Redevelopment for Commercial and Industrial Uses-Out of stock</i>
<i>Coarse Fish-Biology and Management</i>

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<i>Understanding Rural Land Use</i>
<i>Sustainable River Management</i>
<i>Farming-Sustainable Rivers in North West</i>
<i>Habitats Directive</i>
<i>Conservation Access and Annual Report 1997/98</i>
<i>General Quality Assessment-Biology</i>
<i>Cumbrian Lakes Information Pack</i>
<i>Mink</i>
<i>Phytophora-Disease of Alder</i>
<i>Enjoy your Garden/Garden with Care</i>
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<i>Guidance for Control of Invasive Plants</i>
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<i>Buyers Beware-Guide to Stocking Fish</i>
<i>A guide to Careful Salmon Handling</i>
<i>Fish Diseases</i>
<i>New Salmon Byelaws</i>
<i>Anglers and the Environment Agency 1999/2000</i>
<i>Identifying Freshwater Invertebrates</i>
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<i>Pond Heaven</i>
<i>Buffer Strips</i>
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<i>Hormone Disruption in Wildlife</i>
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<i>River Habitat Quality</i>
<i>Freshwater Fish and Wildlife Conservation</i>
<i>Coarse Fisheries Strategy</i>
<i>Catch-Autumn 1999</i>
<i>The construction and renovation of stillwater coarse fisheries</i>
<i>Useful information for angling clubs (Series of 6 Booklets)</i>

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<i>1-Desilting Stillwaters</i>
<i>2-Fisheries Habitat improvement</i>
<i>3-Management of specialist stillwater coarse fisheries</i>
<i>4-Coarse fish biology and management</i>
<i>5-Water plants their function and management</i>
<i>6-Environments for fish</i>
Otters and River Habitat Management
<i>Otter Predation-Is my fishery at Risk?</i>
<i>Salmon-Your part in their future</i>
<i>Salmon Action Plan – River Lune</i>
Salmon Action Plan-River Leven and Crake
Salmon Action Plan-River Ribble
Salmon Action Plan – River Eden
Fisheries Annual Report 1998

Action Plans
Conservation; Fisheries; Flood Defence; Land Quality; Navigation; Process Industries Regulation; Radioactive Substances Regulation; Recreation; Waste Management and Regulation; Water Quality; Water Resources

PIR/RSR (Process Industry Regulation and Radioactive Substances Regulation)
<i>Major Hazard Sites and Safety Reports: What you need to know COMAH</i>
<i>Fees and Charges-Radioactive Substances Act Regulation 1999-2000 (Summary also available)</i>
<i>Charging Scheme for Integrated Pollution Control 1999-2000</i>
The Environment Agency's Pollution Inventory www.environment-agency.gov.uk
<i>Operator and Pollution Risk Appraisal – Version 2</i>
<i>Radiation Warning Leaflet</i>
<i>Radioactivity in the Environment-Report for 1997</i>
BPEO (Best Practical Environmental Option) Assessment for IPC

Water Resources
<i>Abstraction Metering Good Practice Manual</i>
<i>Annual Abstraction Charges 1999-2000</i>
<i>Water Resources in North Cumbria – Consultation Document</i>
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<i>Conserving Water in Buildings-Factcards 1-14</i>
<i>Local Agenda 21 Leaflet</i>
<i>Safeguarding the Environment – A Guide to developers</i>

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<i>River Valley Initiatives</i>
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<i>Water Wise or Water Waster</i>
Making your home and garden more water efficient
Coalburn-Upland Forestry
Hydrometry measurement of water
<i>Spray Irrigation-information for potential irrigators</i>
Water Resources in the North West
Sustainable Water Resources for the Future: Values and Challenges
Sustainable Water Resources for the Future-Summary Leaflet
<i>Introduction to Groundwater Regulations</i>

Waste
Minimise Waste-Maximise Profits
<i>Waste Management Licensing 1999-2000-Charges Scheme (Summary Leaflet also available)</i>
<i>Be a waste Detective-Help us to protect the environment</i>
<i>Waste Management Licensing and Contaminated Soil-Interim Guidance for Developers</i>
<i>Tyres in the Environment-Summary Report</i>
<i>Money for Nothing your waste tips for free-Are Your Profits going up in smoke</i>
Waste Minimisation and Recycling Guide-South Area-Out of Print (New Edition available Feb'00)
Transfrontier Shipment of Waste
<i>Motor Vehicle Waste</i>
Special Waste Leaflets 1-3
Information Sheet 1 – Classification of Special Waste
Information Sheet 2 – Use of Consignment Note
Information Sheet 3 – Obtaining and Sending Consignment Note
Duty of Care (Update)
<i>If they dump it, dump on them (FlyTipping Guidance)</i>
Special Waste Regulations 1996
What a Waste
Environment Agency and Contaminated Land
<i>Asbestos Waste</i>
Interim Guidance for disposal of Contaminated Soils-Version 2
Are Your Profits Going up in smoke.....!

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<i>Waste Management Technical Papers</i>
<i>Interim Guidance on the use of Geomembranes in Landfill Engineering</i>
<i>Interim Framework for Landfill Engineering</i>
<i>Interim Guidance on the Geophysical testing of Geomembranes for Landfill Engineering</i>
<i>The use of nuclear density gauges for compliance of earthworks on landfill sites</i>
<i>Interim guidance on Nonwoven protector geotextiles for landfill engineering</i>
<i>A methodology for cylinder testing of protectors for geomembranes</i>
<i>Earthworks on Landfill Sites-Technical Note on the Design, Construction and Quality Assurance of Compacted Clay Liners</i>
<i>Interim guidance for inspecting and construction of Landfill Liners</i>
<i>Leachate Management Report</i>

Flood Defence
<i>Shoreline Management Plans-A partnership for coastal defence management</i>
<i>Shoreline Management Plan-(a) Liverpool Bay -Great Orme's Head to Formby Point</i>
<i>Shoreline Management Plan-(b) Formby Point to Fleetwood</i>
<i>Shoreline Management Plan © River Wyre to Walney Island</i>
<i>Shoreline Management Plan (d) Earsse Point Isle of Walney to St Bees Head</i>
<i>Shoreline Management Plan (e) St Bees Head to the Scottish Border</i>
<i>Action Plan for Flood Forecasting, Warning and Response-Progress Report-March 1999</i>
<i>Action Plan for Flood Forecasting, Warning and Response-Progress Report-June 1999</i>
<i>Action Plan for Flood Forecasting, Warning and Response-Progress Report-September 1999</i>
<i>Disposal of Cut Vegetation-Best Practice Guidelines</i>
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<i>Who's on my land</i>
<i>Flood Defence North West</i>
<i>Coastal Flooding in North West</i>
<i>Living on the Edge</i>
<i>Policy and Practice for Protection of Flood Plains</i>
<i>Environment Agency-Culverting Policy-Technical Guidance</i>
<i>Environment Agency-Culverting Policy-Explanation of Policy</i>
<i>Environment Agency-Culverting Policy-Policy Statement</i>
<i>Floodline Information Pack</i>
<i>Main River</i>

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Pollution Prevention Guidance
Pollution Prevention Guidance Notes 1-22 (Listed below)
PPG1-General guide to the prevention of pollution of controlled waters
PPG2-Above ground oil storage tanks
PPG3-The use and design of oil separators in surface water drainage systems
PPG4-Disposal of sewage where no mains drainage is available
PPG5-Works in, near or liable to affect watercourses
PPG6-Working at demolition & Construction sites
PPG7-Fuelling stations: construction & operation
PPG8-Safe storage & disposal of used oils
PPG9-Pesticides
PPG10-Highway Depots
PPG11-Industrial Sites
PPG12-Sheep Dip
PPG13-The use of high pressure water & steam cleaners
PPG14-Boats and Marinas
PPG15-Retail premises
PPG16-Schools and other educational establishments
PPG17-Dairies and other milk handling operations
PPG18-Managing fire water and major spills
PPG19-Garages and vehicle service centres
PPG20-Dewatering underground ducts and chambers (PPG21 not yet available)
PPG22-Dealing with spillage's on highways - <i>Update</i>
PPG 23 – Maintenance of Structures Over Water
Farm Pollution and How to Avoid it
Silt Pollution and How to Avoid it
River Pollution and How to avoid it
Silage Pollution and How to Avoid it
Home Pollution and How to avoid it
Chemical Pollution and How to avoid it
Solvent Pollution and How to avoid it
Making the Right Connection
Nitrate Vulnerable Zones
Farm waste Regulations
Farm Waste Management Plans
Mobile Sheep Dipping
Sheep Dipping
Building a Cleaner Future
Pollution Prevention Pays
Accreditation Scheme for Spill response contractors
Nature's Way
Concrete/Masonry Bunds
Oil Care-Follow the Code
Oil Care on your Boat

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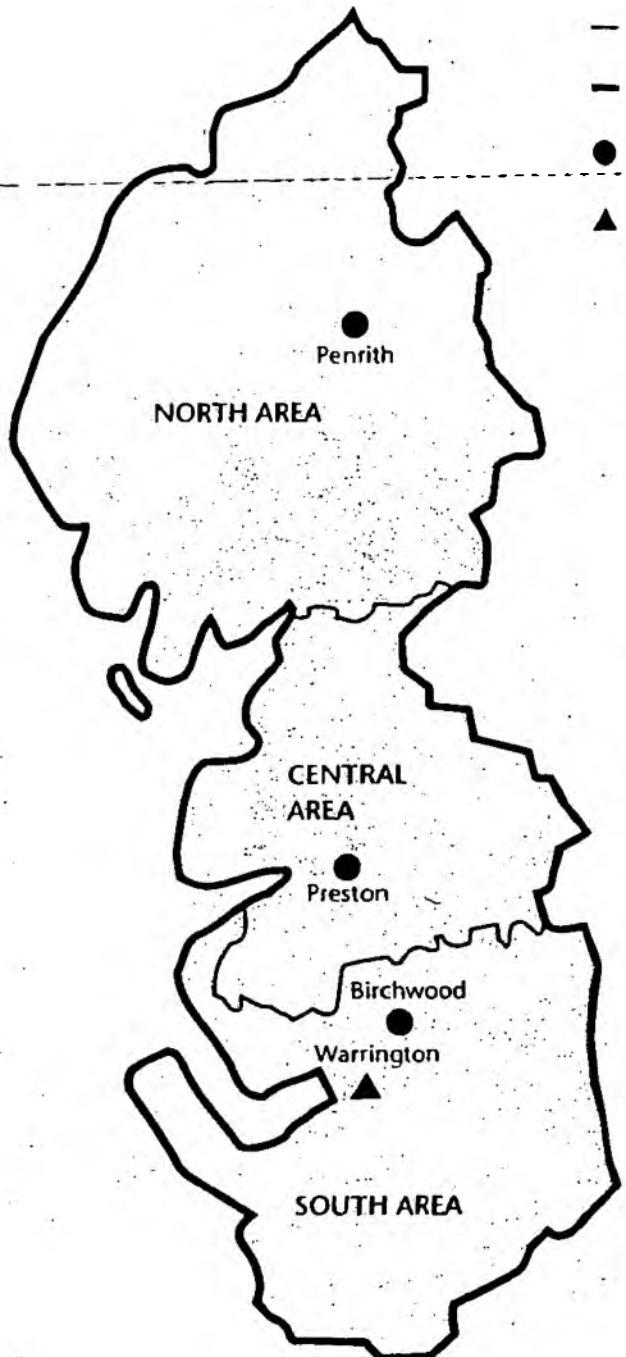
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— Area Administrative Boundaries

— Regional Boundary

● Area Office

▲ Regional Headquarters



For general enquiries please call your local Environment Agency office. If you are unsure who to contact, or which is your local office, please call our general enquiry line.

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0645 333 111

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