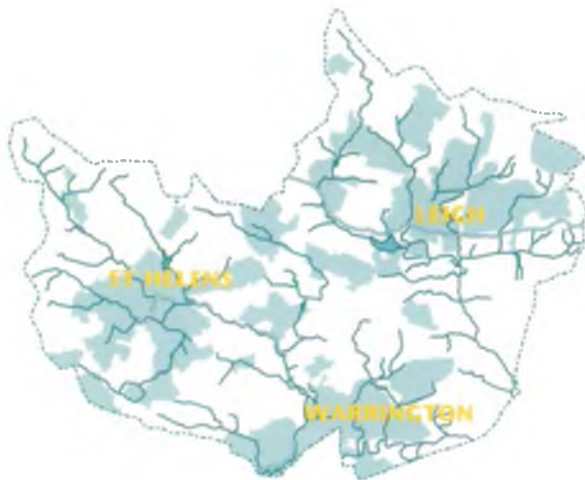


local environment agency plan

SANKEY/GLAZE **CONSULTATION REPORT** **MAY 1996**



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ENVIRONMENT
AGENCY

Sankey/Glaze Local Management Plan

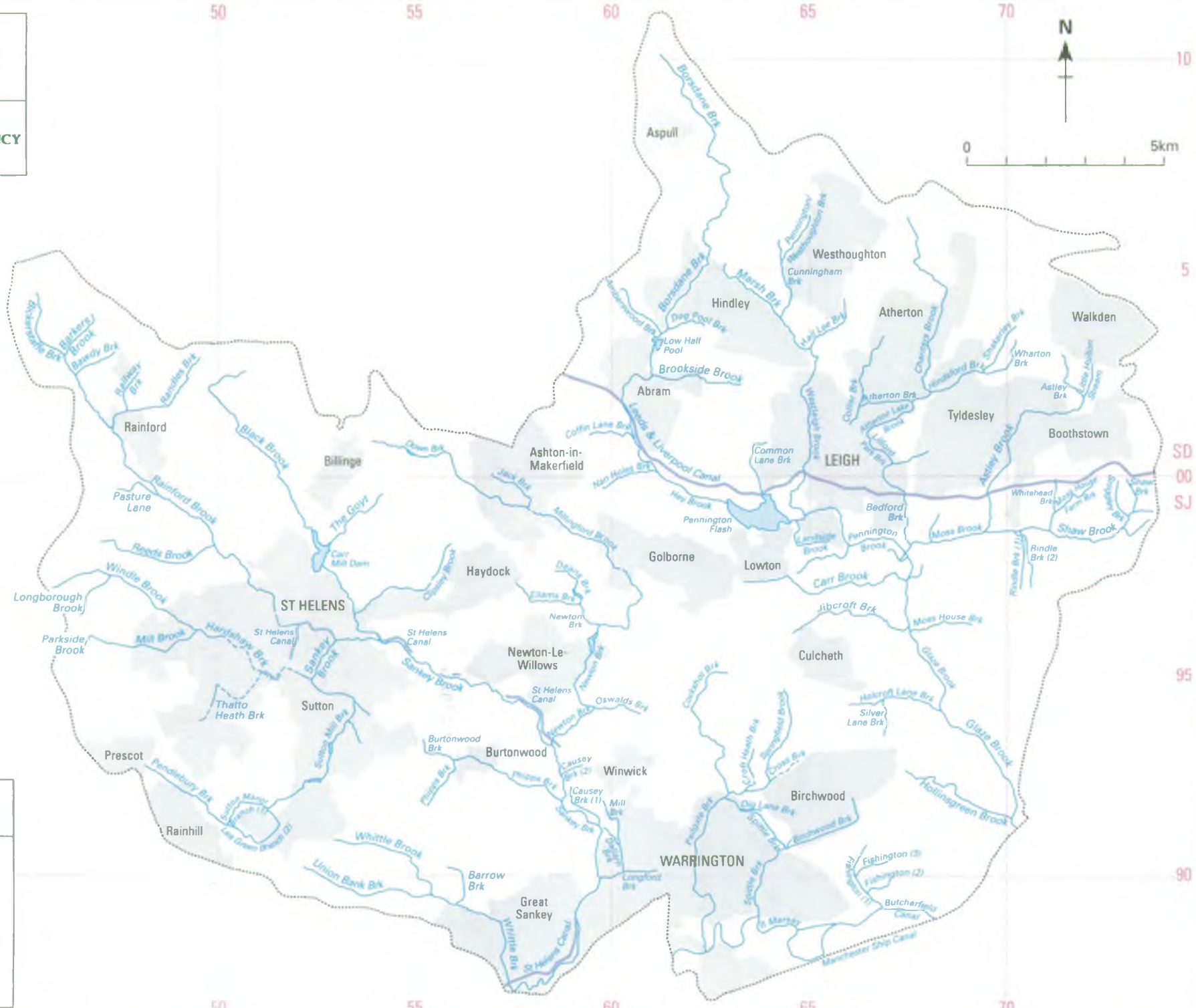
Map 1



ENVIRONMENT AGENCY



0 5km



The Area

KEY

- Catchment Boundary
- Watercourse
- - - - - Culverted Watercourse
- Canal
- Built up Area

The Vision for The Area

The Environment Agency will work in partnership with area users to realise the full environmental potential of the Sankey/Glaze area. The aim will be to create and maintain a balanced environment which will meet the Agency's overall aim of contributing to the worldwide goal of Sustainable Development, which has been defined as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The Agency will continue to maintain the close working relationship with the Mersey Basin Campaign, which was fostered by the National Rivers Authority, to pursue this environmental initiative.

The twenty-five year vision for the area is centred around a water quality which will have improved to a level that will support a healthy aquatic environment and continuous open river corridors. The area will be valued by local people as a recreational and amenity asset.

This vision will be achieved by addressing the impact of contaminated land, waste and effluent disposal and mine spoil heaps. Other pollution sources will be regulated and controlled to levels that will minimise the risk to the environment both on a local and a global scale.

Watercourses will be managed to provide flood protection whilst maintaining naturally diverse river corridors. Wherever physically possible culverts will have been opened to remove physical barriers, for wildlife, from the watercourses. New development will have been regulated by Agency controls, and through liaison with local planning authorities, to provide open river corridors with development sited to reduce the risk of flooding.

Surface and groundwater resources will be managed to provide quantities of water that satisfy the demands of the water companies, agriculture and industry and minimise the risk of rising groundwater, whilst continuing to provide enough water, to support the aquatic environment and provide for recreational users.

The watercourses will support wide recreational and amenity uses, such as, angling, contact water sports and walking with continuous green corridors. The ecological value of the area will improve and archaeological sites will be protected.

In achieving this vision of the Sankey/Glaze area the Agency will continue to advise and work in partnership with organisations and enforce, where necessary, the relevant regulations.

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Section 1

Local Environment Agency Planning

**An introduction to the Environment Agency and the process of
Local Environment Agency Planning.**

The Environment Agency

The Environment Agency for England and Wales is one of the most powerful environmental regulators in the world.

It provides a comprehensive approach to the protection and management of the environment by combining the regulation of land, air and water. Its creation is a major and positive step, merging the expertise of the National Rivers Authority, Her Majesty's Inspectorate of Pollution, the Waste Regulation Authorities and several smaller units from the Department of the Environment.

Industry benefits because it now deals with one regulator instead of three. The Agency seeks to become a "first stop shop" for all business activities.

The Agency's overall aim of protecting and enhancing the whole environment contributes to the world-wide environmental goal of Sustainable Development.

The Agency works towards Sustainable Development through seven objectives, set by Ministers:

- An integrated approach to environmental protection and enhancement, taking into consideration the impact of all activities and natural resources.
- Delivery of environmental goals without imposing disproportionate costs on industry or society as a whole.
- Clear and effective procedures for serving its customers, including the development of single points of contact with the Agency.
- High professional standards, using the best possible information and analytical methods.
- Organisation of its own activities to reflect good environmental and management practice, and provision of value for money for those who pay its charges, as well as for taxpayers as a whole.
- Provision of clear and readily available advice and information on its work.
- Development of a close and responsive relationship with the public, including Local Authorities, other representatives of local communities and regulatory organisations.

To achieve these objectives, the Agency must work with, or seek to influence central government, local government, industry, commerce, farming, environmental organisations, riparian owners and the general public.

The Environment Agency

Successful management of the environment requires consideration of a wide range of interests and requirements which may sometimes be in conflict. The Agency will manage the environment through its wide ranging responsibilities which include:

- flood defence, including the protection of people and property;
- flood warning;
- effective management of the water resources;
- regulation of waste;
- integrated pollution control;
- control of pollution and improving the quality of rivers, groundwaters and coastal waters;
- maintenance and improvement of fisheries;
- promotion of water based recreation including navigation;
- the conservation of the natural water environment.

The Process

The production of Local Environment Agency Plans (LEAPs) within the Agency involves three stages:

- The Local Environment Agency Plan Consultation Report.
- The Local Environment Agency Plan five year Action Plan.
- The Annual Review.

This plan is the first to be produced within the North West Region following the formation of the Agency. It follows a series of Catchment Management Plans produced by the National Rivers Authority (NRA). As much of the preparatory work for the Consultation Report was completed within the lifetime of the NRA, the issues raised concentrate on the water environment. However, staff of the partner organisations within the Agency (Her Majesty's Inspectorate of Pollution and the Waste Regulation Authorities) were involved in the preparatory process, but, their activities will be more central to the action plan developed following the consultation period. We, therefore, particularly welcome comments with respect to Integrated Pollution Control and Waste Management

Consultation Report

The Consultation Report includes the following elements:

Vision

The vision expresses the realistic long term aims for the area within a context of up to 25 years.

Uses

The uses of the area are identified and discussed. Information is presented in the form of a map with supporting text. Uses that may have impact on the environment or impose requirements on the environment.

Objectives

The objectives for the use are considered and summarised.

Issues Arising

Having considered the current state of the area and compared it to the objectives, the issues to be considered have been identified.

These are listed, referenced and are discussed in more details in the issues section.

The Process

Issues and Options

The identified issues are discussed and where possible options for their resolution are proposed.

The LEAP Consultation Report is intended to form a basis for consultation between the Agency and all those with interests in the area.

Consultees may wish to:

- Raise additional issues not identified in the plan.
- Comment on the issues and options identified in the plan.
- Suggest alternative options for resolving identified issues.

We recognise that many of the issues and options for action identified by the consultation report will involve many organisations or individuals. Your views will be crucial to the preparation of the Action Plan.

Local Environment Agency Plan Action Plan

The Action Plan will be produced following consultation and will have regard to the comments received. Once produced, the plan will form a basis for future actions within the area for the next five years and will be a public document. It will detail the nature of actions required, the cost, timescale and responsible organisations. The Agency will be seeking commitment to planned actions by others wherever possible.

Annual Review

The Agency will be jointly responsible, with other identified organisations and individuals, for implementing the Action Plan. Progress will be monitored and normally reported annually, by means of a review document which will be publicly available.

The review document will comprise the following information:

- A detailed comparison of actual progress against planned progress.
- Identification of additional actions to maintain progress in the light of changes in the area.
- Consideration of the need to update the LEAP.

The Process

Update requirements will obviously depend on the particular needs of the area. However, updates to the LEAP will normally be undertaken every five years. Key organisations and individuals forwarding comments will receive an annual review paper to update them with the action plan progress.

The Sankey/Glaze Local Environment Agency Plan Consultation Report (May 1996) attempts to highlight the most significant issues and solutions for rectification within a time scale of five years.

Constraints

The completed plan will inevitably be subject to some limitations.

To ensure improvements and overcome the problems in the area, actions, which in many cases are the responsibility of other organisations and individuals, will be necessary. The Agency does not have the powers to make the necessary changes, but will use its influence to improve the state of the area wherever possible.

The Process

We would like to hear your views:

- Have all the major issues been highlighted?
- Have all the options been considered for resolving the issues that have been identified?
- Do you have any comments to make regarding the plan in general?
- Comments on the Sankey/Glaze Local Environment Agency Plan Consultation Report should be received by 1st September 1996.
- All written responses shall be considered to be in the public domain unless Consultees explicitly request otherwise.
- If you would like further detailed information or would like to comment on this document please write to:

Environment Planner
Environment Agency
North West Region
"Mirwell"
Carrington Lane
SALE
M33 5NL

Tel: 0161-973-2237
Fax: 0161-973-4601

Front cover photograph: Nine Arches at Newton-Le-Willows.

Section 2

**OVERVIEW
OF THE AREA**

This section gives a brief overview of the area.

2.1 Introduction

The Sankey/Glaze Local Environment Agency Plan area includes the areas of Glaze Brook and Sankey Brook, their tributaries and the River Mersey from Bollin Point to Howley Weir. It also includes are the catchments of Padgate, Spittle, Fishington and Whittle Brooks and their tributaries which drain into the River Mersey. The area lies to the west of Bolton and the north and north west of Warrington, taking in St Helens, Leigh, Newton-Le-Willows and the north side of Warrington.

The area is generally of low altitude and flat. Land use in the area is made up predominantly of urban development or agriculture, with small areas, of wetland, mossland and woodland. Agricultural land use is mainly split between arable and grassland.

Historically the area was important for the extraction of coal and the production of chemicals. Coal was extracted both from deep pits and opencast mining, which still goes on. The legacy of this industry is easy to see in the area, in the form of mine spoil heaps and the effects of subsidence. It has also left a legacy of water quality problems in the area. The chemical industry was centred around the St Helens area, its legacy is not so easy to see, but, it is still having a marked affect on the environment and is difficult to remedy.

Sankey Brook originates at the confluence of Hardshaw and Sutton Brooks, in the centre of St. Helens. It flows in a south easterly direction before discharging into the River Mersey near Penketh. The Sankey area is 179 km² and has a Main River length of 126 km. Both upstream and downstream of St Helens the brooks flow through predominantly agricultural land. Over the years flood protection standards through Warrington have been improved by the construction of flood alleviation schemes including diversions of the original course.

Many smaller tributaries feed the Sankey, the most notable being Newton Brook draining Ashton-In-Makerfield, Golborne and Newton-Le-Willows; Hardshaw and Sutton Brooks draining Windle, Eccleston and Rainhill; Rainford Brook draining Rainford and Black Brook Which drains the north of St. Helens and Billinge areas.

Glaze Brook originates at the confluence of Pennington and Moss Brooks, approximately 120 m north of Hawkurst Bridge. The Glaze area is 169.8 km² and has a Main River length of 116.5 km. The brooks flows south past Glazebury before discharging into the Manchester Ship Canal, south east of Cadishead, at an altitude of less than 10 m, Above Ordnance Datum (AOD).

The Glaze has a number of tributaries, the most notable being Pennington Brook which originates at Pennington Flash, a flooded subsidence depression to the southwest of Leigh. Pennington Flash is fed by Hey Brook and its tributaries with an altitude of 120 m AOD to the North of the area, draining Hindley and Abram. Downstream of the Flash, Pennington Brook is fed by West Leigh Brook draining Westhoughton, the east of Hindley and the west of Leigh with altitudes up to 120 m AOD.

**Sankey/Glaze
Local Management Plan
Map 2**



ENVIRONMENT AGENCY



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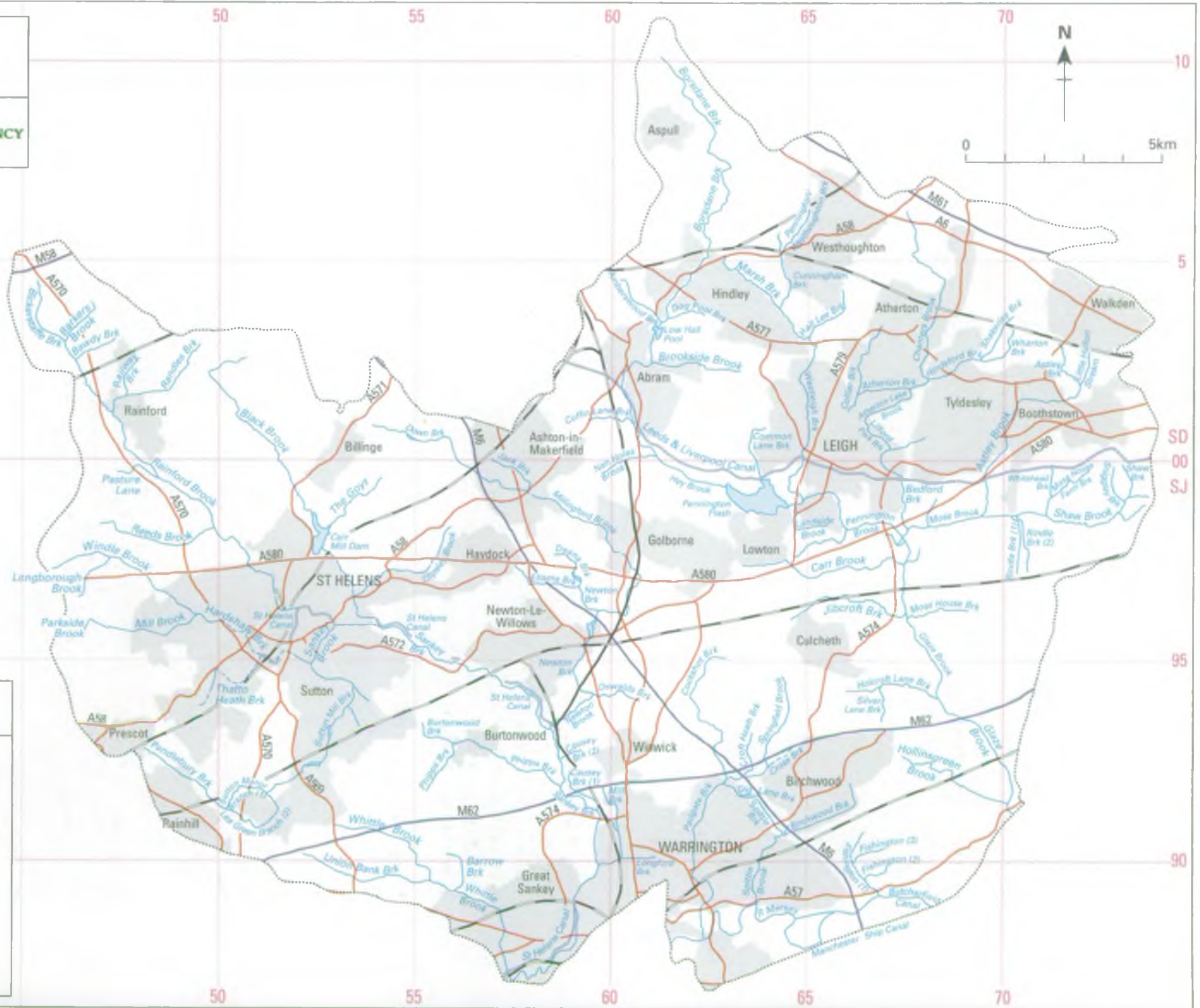
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Infrastructure

KEY

-  Catchment Boundary
-  Watercourse
-  Culverted Watercourse
-  Canal
-  Built up Area
-  Motorway
-  A Road
-  Rail Network



2.1 Introduction

Other notable tributaries of the Glaze are Moss Brook and Shaw Brook draining Tyldesley, Boothstown and Walkden with altitudes up to 110 m AOD and Bedford Brook draining Atherton and the eastern part of Leigh. The Lilford Park storage reservoir and Bedford pumping station are situated within the area of Bedford Brook.

Padgate, Spittle, Fishington and Whittle Brooks drain the south of the area around Warrington and discharge into the River Mersey. Their combined area is 60.7 km² including 14.64 km of Main River.

2.2 Hydrology

Hydrology

The tables below show the rainfall for the area and the Long Term Average (LTA) as recorded by the NRA.

Sankey Brook (recorded at Gatewarth)										
Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	LTA 1986- 1994
Rainfall mm	703	847	874	772	742	590	766	683	779	792

Glaze Brook (recorded at Bedford)										
Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	LTA 1964- 1994
Rainfall mm	993	885	937	883	919	718	1039	865	1018	911

See Map 3

**Sankey/Glaze
Local Management Plan
Map 3**



ENVIRONMENT AGENCY



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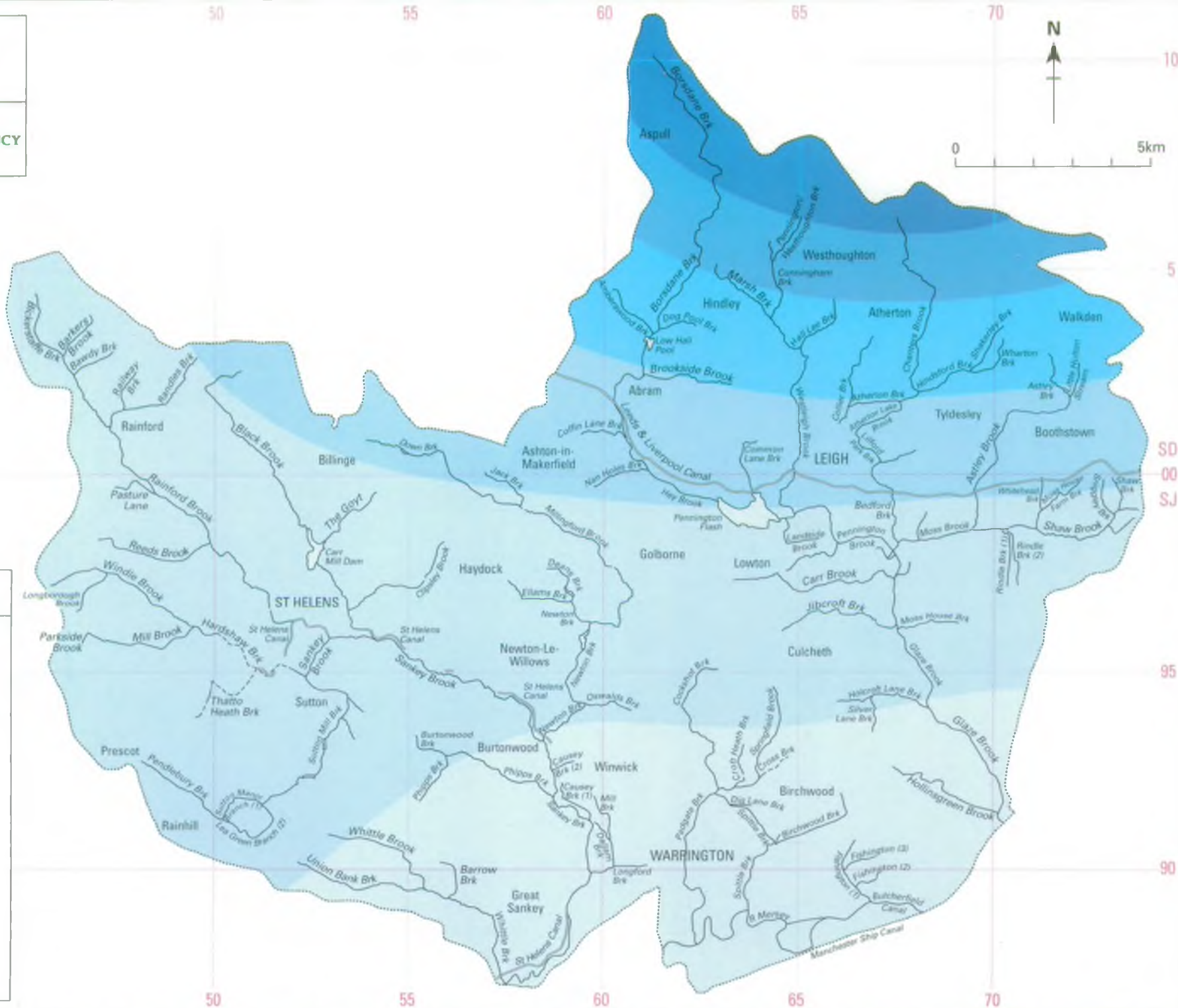
Rainfall

KEY

- Catchment Boundary
- Watercourse
- - - - Culverted Watercourse
- Canal

Long Term Average Rainfall
(1961-1990)

- >1050 mm
- 1000 - 1050 mm
- 950 - 1000 mm
- 900 - 950 mm
- 850 - 900 mm
- 800 - 850 mm



50 55 60 65 70

**Sankey/Glaze
Local Management Plan**

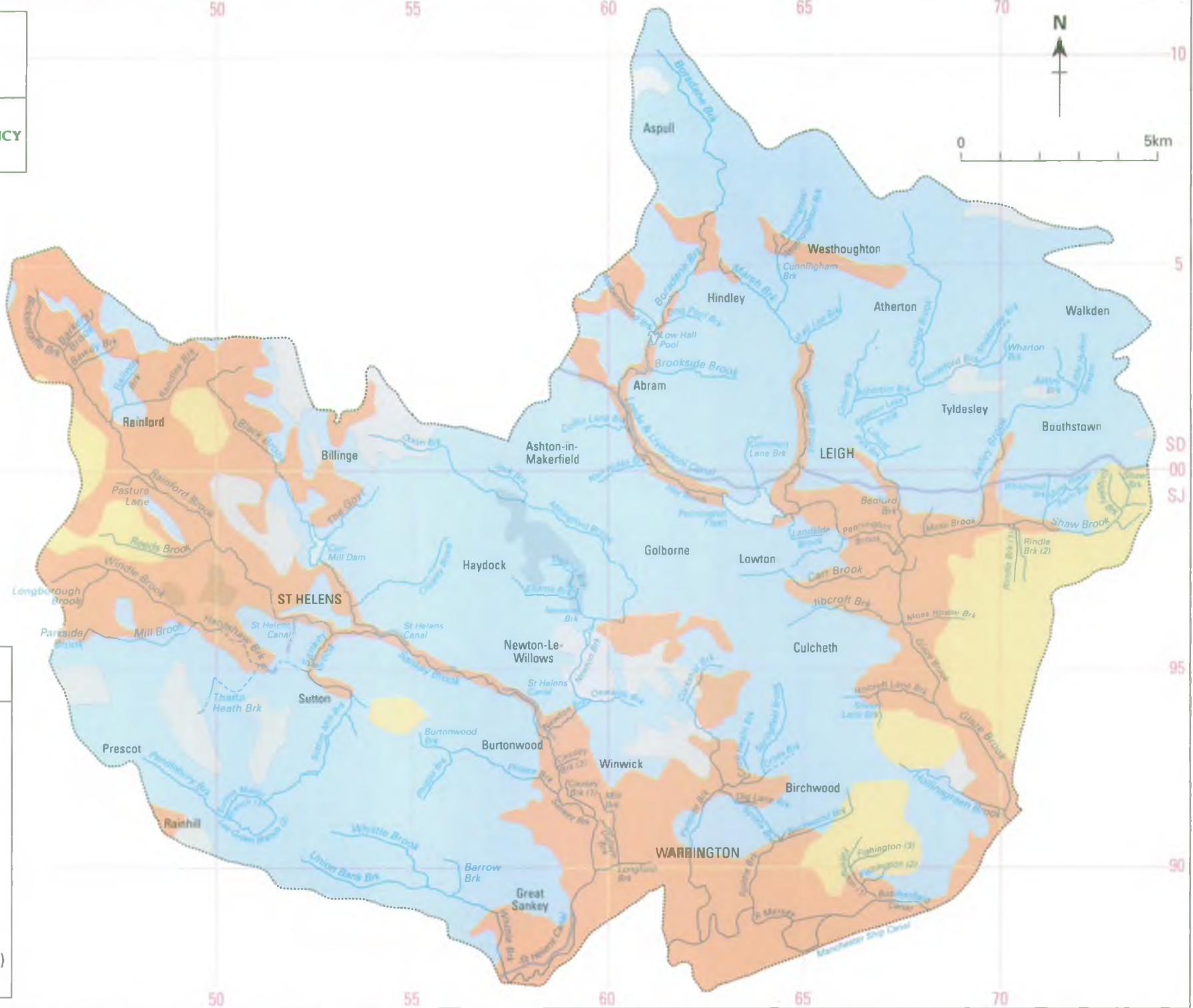
Map 5



ENVIRONMENT AGENCY



0 5km



Drift Geology-Simplified

KEY

- Catchment Boundary
- Watercourse
- Culverted Watercourse
- Canal
- Drift free area
- Peat - minor aquifer
- Sand and Gravel - minor aquifer
- Glacial Till (Boulder Clay) - non aquifer

2.3 Geology

General

The northern and north western part of the area is underlain by rocks of the Carboniferous Age (Coal Measures), comprising alternating sandstones, shales or mudstones, and coal seams. To the south east of a line from Ashton-in-Makerfield to Rainhill, and to the south of a line from Abram in the west to Boothstown in the east, younger permo-triassic rocks are present. These are predominantly Sherwood Sandstones, although finer grained Mercia Mudstones occur in the extreme south east of the area, around Hollins Green.

Sankey Area

Except for a few areas of rock outcrop the entire Sankey area is underlain by 'drift deposits'. Glacial clays (tills) are present throughout the area. These are overlaid by a widespread, thin belt of windblown sand to the north west of St. Helens. Peat bodies have also developed in this area, for example at, Holiday Moss and Reeds Moss. The glacial clay has been incised by alluvial deposits associated with the Mersey and its tributaries.

Glaze Area

With the exception of a few areas of rock outcrop around Tyldesley, the entire Glaze area is underlain by "drift deposits". Glacial clays with subordinate sands and gravels occur throughout the area. These are overlain and have been incised by alluvial deposits associated with the Glaze, Mersey and their tributaries. Extensive peat bodies have developed in areas of poor drainage, for example at, Chat Moss, Holcroft Moss and Risley Moss.

2.4 Hydrogeology

The Carboniferous sandstones tend to act as individual '*minor aquifers*' separated by the lower permeability shales and mudstones, with groundwater movement by fissure flow. In their undisturbed state, the Coal Measures are capable of supporting small scale agricultural and domestic supplies. However, the dominant control on the hydrogeology of the Coal Measures is the extensive and often interconnected mine workings within the area. These have resulted in complex drainage networks which have been subject to long-term dewatering while the mines were active. However, recent mine closure's pose a risk to the aquifers and surface waters due to problems associated with rising poor quality (ochreous) groundwater.

The Sherwood Sandstone (Permo Triassic) present in the area forms part of the Lower Mersey Basin - a '*major aquifer*' which extends east to Manchester and westwards to Merseyside. This has been and still is heavily exploited for public water supply, within the Sankey area and was heavily exploited in the past for public water supply, in the western half of the Glaze area. It is also used by smaller industrial and commercial abstractors around Moss Brook. Groundwater levels are naturally high (close to or even above ground level) except where they have been depressed by many years of heavy pumping.

The Mercia Mudstones are generally of low permeability and are classed as '*non-aquifer*' although they may be capable of yielding very limited quantities of groundwater.

2.5 Water Quality

The Environment Agency has a statutory responsibility to monitor the pollution of controlled waters. Controlled waters include rivers, streams, lakes, ditches, groundwaters, estuaries and coastal waters. This is achieved by chemical, biological and micro biological means. The Agency is also the competent authority in the UK to undertake the obligations of certain European Union (EU) Directives relevant to water quality. Water Quality information is available to the public and held on the Water Resources Act Register, at the Environment Agency, North West Regional Office, Richard Fairclough House, Knutsford Road, Warrington.

The chemical quality of, and the aquatic life supported by, significant watercourses is monitored on a regular basis in a routine programme. This allows the water quality to be categorised and targets assessed, relating to domestic UK classification schemes or arising from EU Directives.

Pollution is controlled at source by a number of means:

- The discharge of effluent to watercourse is permitted only with the consent of the Agency. Conditions are attached to discharge consents to control the impact on receiving watercourses.
- The inspections of farm and industrial sites are undertaken and remedial measures recommended, where appropriate to minimise the risk of pollution.
- During the consultation process with local authorities, the Agency gives advice, in respect of water pollution control requirements to be included in planning permissions, Integrated Pollution Control authorisations and waste management licences.
- The Agency is also consulted by, and directs North West Water Ltd on the ongoing programme of sewerage and sewage treatment improvements.

The Agency provides a 24 hour response service to pollution incidents.

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, relate to the chemical quality requirements for different aquatic ecosystems. Details of the scheme and the standards are given in Appendix 4.

The Definition of the RE classes in chemical terms can be equated with the broad description, with particular reference to the fish population, that could be expected to be supported by the ecosystem.

- Class RE1: Water of very good quality (suitable for all fish species).
- Class RE2: Water of good quality (suitable for all fish species).
- Class RE3: Water of fair quality (suitable for high class coarse fish populations).

2.5 Water Quality

- Class RE4: Water of fair quality (suitable for coarse fish populations).
Class RE5: Water of poor quality (likely to limit coarse fish populations).
No class Water of bad quality (in which fish are unlikely to be present).

Biological Classification

The biological classification method used in this report relies on placing freshwater invertebrates into groups or families. Each family is given a score, the value of which is related to the tolerance of that family to pollution. Abundances are also recorded to highlight the dominant families in a sample. The results are pooled for each sample and provide the basis for a classification system (see appendix 4). For each of the classified stretches of the Glaze and Sankey, long term Biological RQOS have been proposed. **Map 6** shows the current state of compliance.

For the classified stretches of the Glaze/Sankey area short term and long term RE RQOs have been proposed. **Map 7** shows the current state of compliance with the proposed short term RE RQOs and **Map 8** shows the current compliance with the long term RQOs. The proposed objectives are also recorded here. For the proposed current objectives, where no data is indicated the objective applies with immediate effect.

Local monitoring of the watercourses in the Glaze/Sankey area carried out during the period 1992 to 1994 indicates the chemical quality of the water is generally poor, this is as a direct result of man's activities **Map 9**.

At one time mining was a major industry in the area and many of the water quality problems found today are associated with the industry. The sources of pollution are either direct discharges from known points, such as abandoned mines, or from more diffuse sources, such as leachates from spoil heaps and contaminated surface water run-off. A number of brooks across the area suffer from ochre which discolours the water and can harm the fauna and flora.

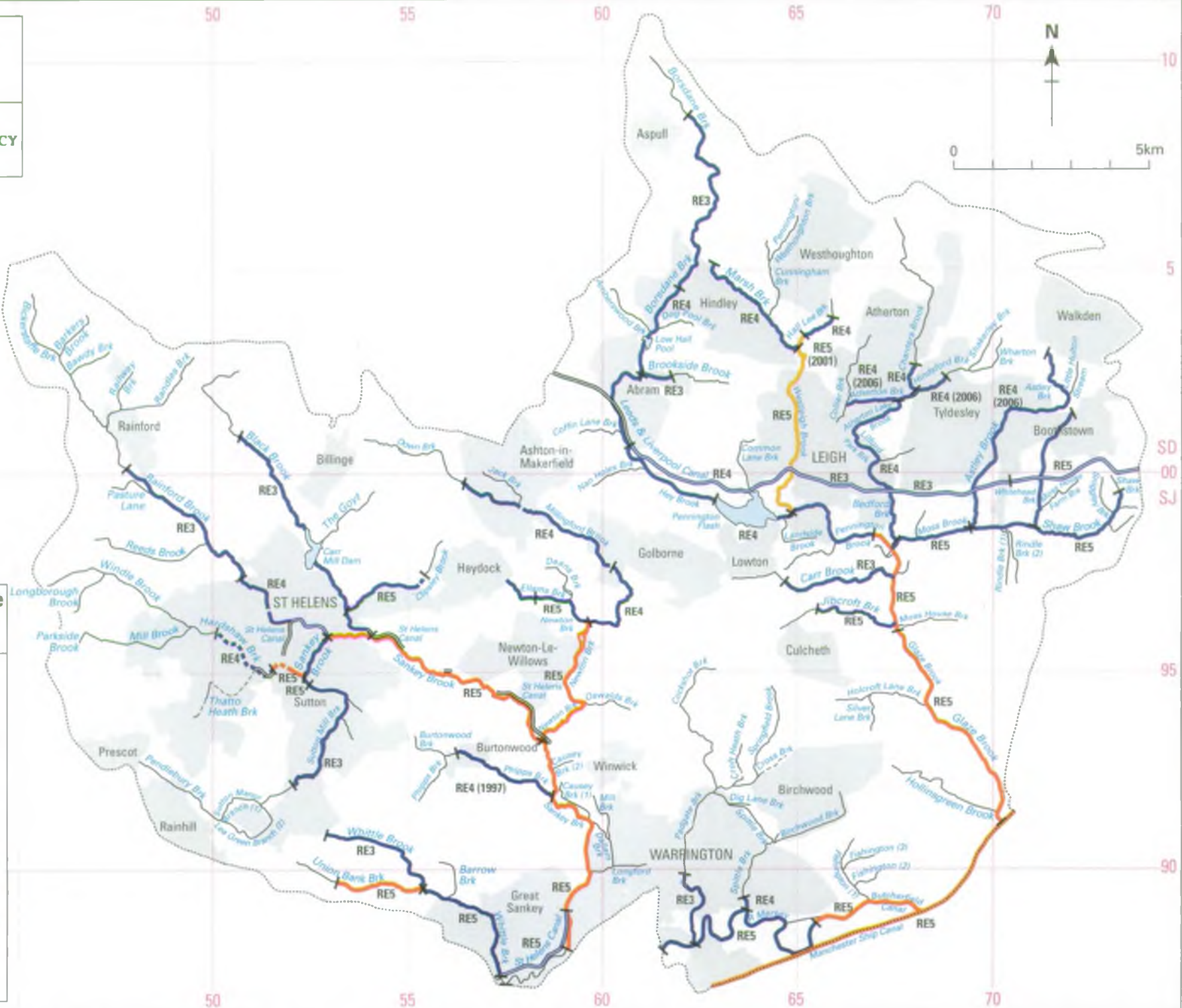
Discharges from land, contaminated by industry and from industrial and domestic waste, have a significant impact on the water quality within this area. Today the disposal of waste and waste sites are carefully controlled, however, in the past limited consideration was given to the likely environmental impact of these waste materials, some of which can be very toxic.

In more populated areas pollution of watercourses from drainage systems is widespread. In some places, where there are separate drainage systems for surface waters and sewage, wrong connections of foul sewage to the surface water system occur. The result is contaminated discharges entering the nearest watercourse instead of the sewage treatment works.

**Sankey/Glaze
Local Management Plan
Map 7**



ENVIRONMENT AGENCY



**Water Quality: Compliance
with Proposed Short Term
River Ecosystem RQOs**

- KEY**
- Catchment Boundary
 - - - - Culverted Watercourse
 - Built up Area
 - River
 - Canal
 - RE () Objective (date) RE ()
 - Compliant ---
 - Marginal Failure ---
 - Significant Failure ---
 - Unclassified —
 - Reach Boundary

**Sankey/Glaze
Local Management Plan
Map 8**



ENVIRONMENT AGENCY



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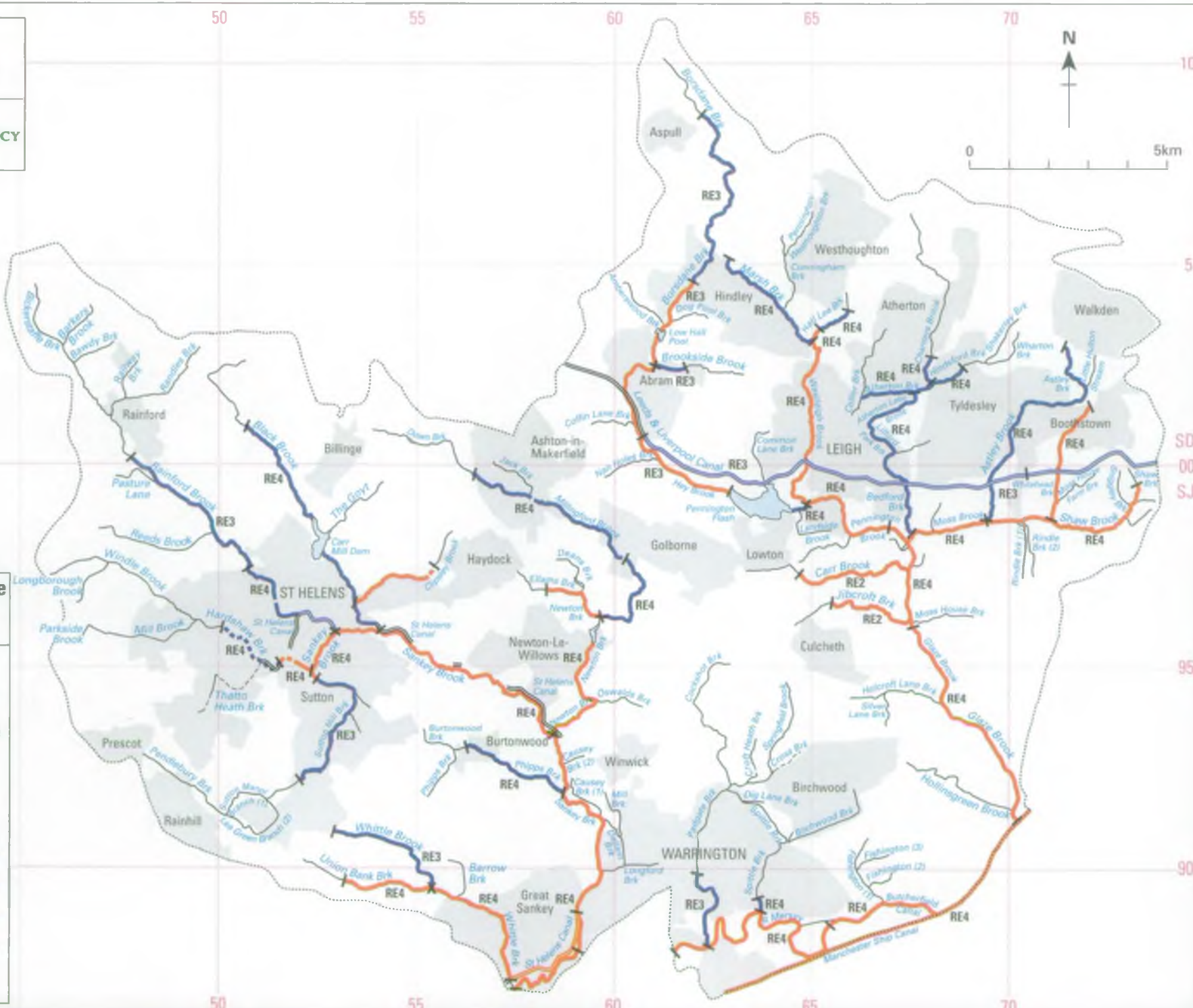
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Water Quality: Compliance with Proposed Long Term River Ecosystem RQOs

KEY

- Catchment Boundary
- - - - - Culverted Watercourse
- Built up Area
- River
- Canal
- RE () Objective (date) RE ()
- Compliant ---
- Marginal Failure ---
- Significant Failure ---
- Unclassified —
- Reach Boundary



**Sankey/Glaze
Local Management Plan
Map 9**



ENVIRONMENT AGENCY



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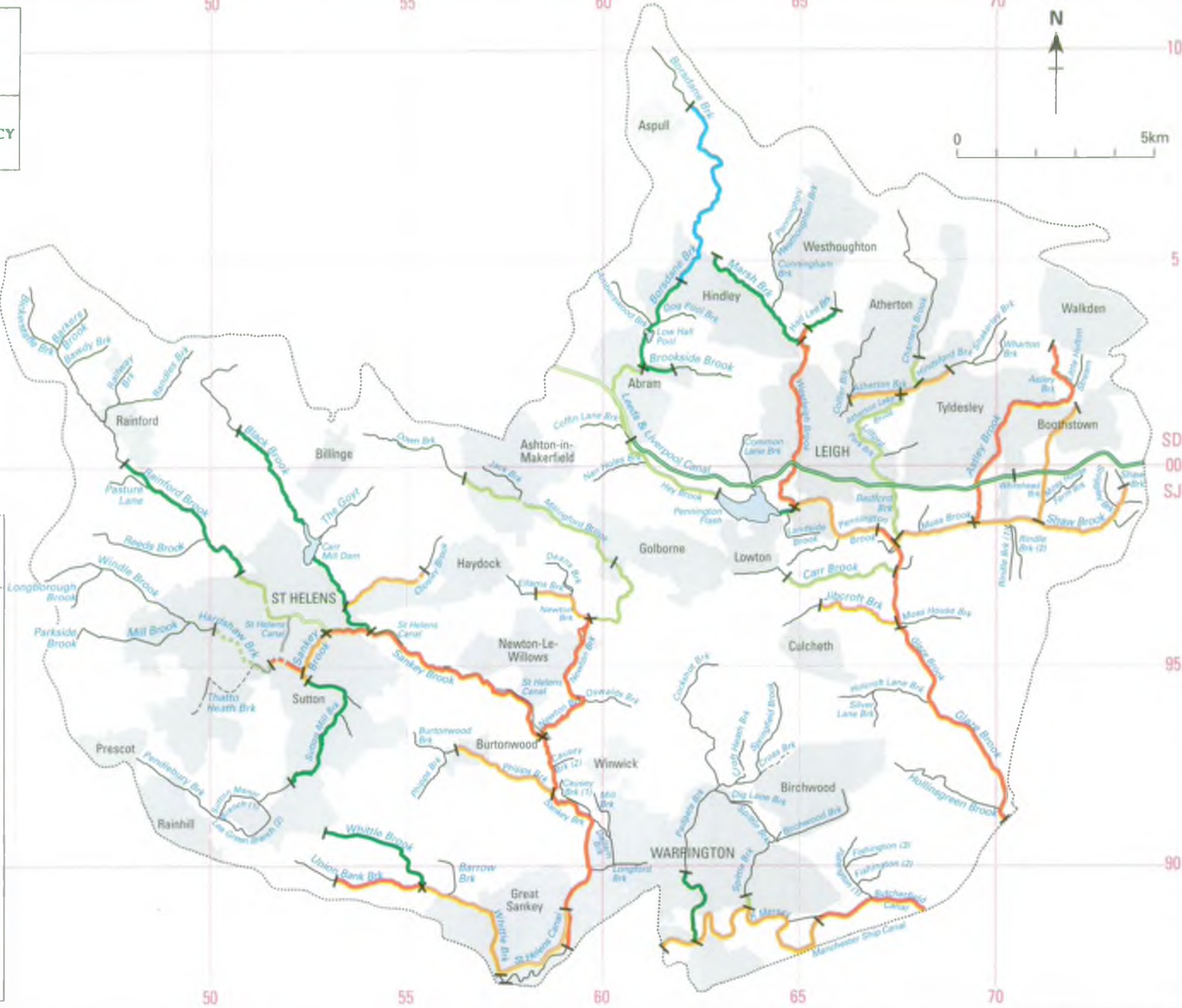
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**Water Quality: General
Quality Assessment
Chemical Grading 1994**

KEY

- Catchment Boundary
- - - - - Culverted Watercourse
- Built up Area

Rivers		Canals	
—●—●—●—	A } Good	—●—●—●—	A } Good
—■—■—■—		B } Fair	
—■—■—■—	C } Fair	—■—■—■—	C } Fair
—■—■—■—		D } Poor	
—■—■—■—	E } Poor	—■—■—■—	E } Poor
—■—■—■—		F } Bad	
—	Unclassified	—	Unclassified
—	Reach Boundary	—	Reach Boundary



50 55 60 65 70



2.5 Water Quality

Where the drainage system is combined, with foul and surface water in one pipe, overflow discharges occur when the capacity of the sewerage network is reached, such as in heavy rainfall events. However, due to increased urban development larger flows enter the sewerage networks than they had been originally designed for. The full capacity of the system is reached far quicker resulting in increased discharges to the watercourses. In the Glaze area discharges from the sewage treatment works have had a significant impact on the water quality.

Pollution in built up areas also occurs as a result of urban run-off via storm water drains and general surface water drainage from roads, commercial and residential properties. There are a number of motorways crossing the area, the drainage from which have an impact on some of the brooks.

Some diffuse and intermittent pollution occurs as a result of farming, the former is usually as a result of run-off from fertilisers and pesticide spraying and the latter often due to poor management or accidents.

The River Mersey separates from the Manchester Ship Canal at Bollin Point, near Rixton, and flows from here over Woolston Weir and then to Howley Weir, Warrington, the freshwater limit. The Manchester Ship Canal continues on its course to the freshwater limit at Latchford Locks. The water quality is poor mainly due to the upstream influence of discharges to the Manchester Ship Canal from industry, urban run-off and the North West Water Ltd, Wastewater Treatment Works at Salford, Davyhulme and Urmston.

Section 3

ISSUES AND OPTIONS

This section of the plan details specific issues that have been identified in the area.

Supporting information for this section, including details of area uses and targets can be found in the Appendices.

Issue 1

IMPACT OF CONTAMINATED SURFACE WATER DISCHARGES ON SURFACE WATER QUALITY.

Background

Most modern building developments have separate drainage systems, one for uncontaminated surface water run-off the other for foul water (sewage). The surface water drainage is piped and discharged to local watercourses and the foul to a wastewater treatment works.

Problems occur when foul drainage is either incorrectly plumbed into the surface water pipes or when dual manholes occur. There are also occasions when contaminated liquids are poured down surface water drains. These problems are known as "contaminated surface waters" or "wrong connections".

The identification of "contaminated surface waters" problems is undertaken by the Agency, inspections are then undertaken with the local authorities to make site occupiers or householders aware of the problem. NWW Ltd receive lists of "contaminated surface waters" problems that require rectification.

Effects on watercourse

Increased biochemical oxygen demand

Increase in levels of ammonia.

Reduction in dissolved oxygen.

Growths of sewage fungus.

Reduction, or in extreme cases elimination, of aquatic fauna and flora.

Poor aesthetic appearance and unpleasant odours.

Failures to meet objectives :-

a) Newton Brook failures to achieve the proposed water quality RQO and biological objective is partly due to a contaminated surface water discharge.

b) Sutton Brook fails to meet the long term biological objective as a result of contaminated discharges in the Sutton area.

c) Millingford Brook fails to achieve the proposed biological long term objective due to discharges in Golborne and Ashton in Makerfield.

d) Hardshaw Brook from Thatto Heath Brook to Sutton Brook fails to achieve long term water quality RQO and biological objective. Pollution from the Hardshaw Brook Depot surface water sewer discharges to the brook below the A570 and significantly contributes to the poor quality of the brook.

Issue 1

e) Jibcroft Brook significantly fails to meet its long term water quality RQO and biological objective, one of the contributing factors to this is contaminated discharges in the Culcheth area which are being investigated by Warrington Borough Council.

Other Water Quality Problems :-

There are other watercourses and water bodies where "Contaminated surface Water" discharges have a localised impact, including :-

Pendlebury Brook in Clock Face and Rainhill

Windle Brook in St Helens

Randles Brook in Rainford

Sankey Brook in Bewsey and Warrington

Spittle Brook

Clipsley Brook

Ellen Brook

Hall Lee Brook

Westleigh Brook in Leigh

Small Brook

OPTIONS	Responsibility	Advantages	Disadvantages
1. Identification, and prioritisation of wrong connection problems.	Environment Agency, Local Authorities, NWW Ltd.	Identification of the extent of pollution and its resolution.	Cost to NWW Ltd. and Local Authorities.
2. Correction of wrong connections to reduce pollution.	NWW Ltd, Agents, Householders, Industry, Local Authorities.	Improvement in the chemical water quality and aquatic ecosystem. Improved aesthetic, amenity value and fishery potential.	Cost to NWW Ltd / Agents /Local Authorities / Industry / Householders.
3. Do Nothing.		No Cost.	Contribute to the failure to reach objectives.

Issue 2

IMPACT FROM OVERFLOWS ON THE SEWERAGE NETWORK ON SURFACE WATER QUALITY.

Background

In many areas foul drainage and uncontaminated surface water drainage are conveyed together in combined sewers to wastewater treatment works. On the sewerage network are located relief outfalls either on sewers or at pumping stations. These are designed to prevent foul flooding by relieving the system during storm conditions and to only operate when adequate dilution is available in the receiving watercourse.

The increase in residential and commercial development over recent years has consequently led to greater flows going to sewer. In areas with older combined sewerage systems there is inadequate sewer capacity for the increased flow. This has resulted in more frequent operation of storm overflows occurring often in non storm conditions.

Effects on watercourse

Increase in organic load

Reduction in dissolved oxygen levels.

Poor dilution due to discrepancy between discharge volume and flow in watercourse.

Detrimental impact on the aquatic environment.

Presence of sewage fungus.

Unpleasant odours .

Poor aesthetic appearance due to presence of sewage solids and sanitary materials.

Failure to Meet Objectives :-

a) Hardshaw Brook from Thatto Brook to Sutton Brook has three unsatisfactory Combined Sewer Overflows (CSOs) contributing to the brooks failure to achieve the long term water quality RQO and biological objective.

b) Sutton Brook, from Gaskell Street to Rainford Brook reach, has an unsatisfactory CSO that is contributing to the failure to achieve its water quality RQO and biological objective. NWW Ltd plans to improve this under AMP2.

c) Ellams Brook fails to achieve the long term water quality RQO and biological objective partly due to discharges from the Lodge Lane CSO. NWW Ltd. are looking at ways of improving the situation.

d) Newton Brook fails to meet the long term water quality RQO and biological objective partly due to unsatisfactory CSOs. NWW Ltd will be improving these as part of the Newton Drainage Area Plan.

Issue 2

e) Phipps Brook has had pollution problems in the past from the discharge from the Green Jones Brow overflow. NWW Ltd. has now removed this overflow, this should result in the brook meeting its proposed objective of RE4 as a step towards the long term RQO of RE2 and the biological objective.

f) Borsdane Brook from A58, Hindley, to Brookside Brook fails to achieve its long term water quality RQO and Biological objective as a result of a number of unsatisfactory overflows. NWW Ltd. will be working on improvements as part of the Hindley Drainage Area Plan.

g) Hey (Borsdane) Brook from Brookside Brook to Pennington Flash fails to achieve the proposed long term water quality RQO mainly as a result of overflows.

h) Hindsford Brook receives the discharges from a number of unsatisfactory overflows, these combined with other problems result in the reach failing its long term water quality RQO and biological objective. NWW Ltd will be looking to improving the situation as part of the Hindley Drainage Area Plan.

i) Atherton Brook fails to meet its water quality and biological objective partially as a result of unsatisfactory overflows. NWW Ltd. will be looking at improvements as part of the Leigh Drainage Area Plan.

j) Whitehead (Ellen) Brook the failure to achieve the long term water quality objective is partially do to the impact of unsatisfactory overflows. Some overflows are to be included in NWW Ltd. West Salford Drainage Area Plan.

k) Pennington Brook from Westleigh Brook to Leigh WwTW has intermittent discharges from overflows which affect the water quality . The reach fails to achieve its long term water quality RQO.

l) Millingford Brook fails to achieve the long term biological objective and suffers from intermittent pollution and littering as a result of unsatisfactory overflows. NWW Ltd. will be carrying out work as part of the Golborne and Ashton Drainage Area Plans.

m) Sankey Brook fails to achieve the long term water quality RQO and biological objectives in some stretches due to unsatisfactory CSOs have an impact.

n) Astley Brook fails to achieve the long term water quality RQO and biological objective partially as a result of unsatisfactory overflows.

o) Bedford Brook and its tributary, Pen Leach Brook, are affected by intermittent discharges from unsatisfactory overflows .

p) Shaw Brook has problems with unsatisfactory overflows that will be dealt with in due course by NWW Ltd..

Issue 2

Other Water Quality Problems :-

Rainford Brook in St Helens
Whittle Brook in Sankey and Penketh
Windle Brook in St Helens
Dog Pool Brook

Options	Responsibility	Advantages	Disadvantages
1. Reduce the number of unsatisfactory combined sewer overflows.	NWW Ltd.	Possible achievement of the proposed water quality objective. Improvement to the aesthetic and amenity value and fishery potential. Improvement in aquatic ecosystem and in invertebrate diversity.	Cost to NWW Ltd
2. Do Nothing			failure to achieve water quality objectives

Issue 3

IMPACT OF DISCHARGES FROM WASTE WATER TREATMENT WORKS (WwTW) ON SURFACE WATER QUALITY.

Considerable investment has been made by NWW Ltd. to improve a number of WwTW over the last few years and further improvements are programmed for the future under AMP2. The Glaze area in particular has a history water quality problems associated with effluent discharges from WwTW.

Failures to meet objectives:-

- a) Hall Lee Brook is significantly failing its proposed water quality RQO of RE4. Westhoughton WwTW discharges to this watercourse and has had a major impact on the water quality.
- b) Westleigh Brook is failing the proposed water quality RQO partially as a result of the upstream water quality of Hall Lee Brook.
- c) Pennington / Glaze Brook is significantly failing the proposed water quality RQO of RE4 as a result of the discharge from Leigh WwTW.

In 1994 NWW Ltd. carried out extensive work on Westhoughton and Leigh WwTWs to improve the treatment of the effluent and in turn the quality of the discharge going to the brook. The results of monitoring carried out on Hall Lee Brook, Westleigh Brook and Pennington / Glaze Brook in 1995 would indicate that the water quality has improved both chemically and biologically.

OPTIONS	Responsibility	Advantages	Disadvantages
1. Using recent data evaluate the impact of the improvement works at the WwTW.	Environment Agency.	Determine if the water quality objectives have been met .	Do not know if work undertaken has improved situation.
2. Do Nothing.		Saving in time and resources.	

- d) Astley Brook significantly fails to achieve the proposed water quality RQO and biological objective as a result of the discharge from Worsley WwTW and unsatisfactory overflows.

OPTIONS	Responsibility	Advantages	Disadvantages
1. Proposals for the works are being considered to meet Urban Wastewater Treatment Directives. This will be undertaken in the next five years.	NWW Ltd.	Achievement of water quality objectives.	Cost to NWW Ltd.

Issue 3

e) Moss Brook fails the long term water quality RQO and biological objectives partially as a result of the organic load from Tyldesley WwTW.

OPTIONS	Responsibility	Advantages	Disadvantages
1. Reduction in the organic load from Tyldesley WwTW 2. Do Nothing	Environment Agency, NWW Ltd.	Possible achievement of the proposed objectives. Cost savings.	Cost to NWW Ltd. Failure to achieve river ecosystem and biological objectives.

f) Failure of the Glaze to achieve the long term water quality RQO and biological objective. The upstream water quality has an impact on this length as do the two WwTW at Glazebury and Irlam discharging to the watercourse.

OPTIONS	Responsibility	Advantages	Disadvantages
1. Assess impact of WwTW on river water quality. 2. Do Nothing.	Environment Agency.	Provide data for future proposals. Possible cost savings.	Failure to achieve river ecosystem and biological objectives.

g) Sankey Brook receives the discharge from St Helens WwTW. The ammonia concentrations from this works could effect the achievement of the long term water quality RQO and the biological objective.

OPTIONS	Responsibility	Advantages	Disadvantages
1. Assess the impact of the discharge in relation to ammonia on the water quality. 2. Do Nothing.	Environment Agency.	Provide data for future decision making.	

Issue 4

IMPACT OF CONTAMINATED LAND ON THE ENVIRONMENT.

Background

The Glaze/Sankey area has a legacy of land contamination arising from industry. This is particularly true of the St Helens area of the Sankey area, where it is a major feature. Some of the industries which have led to the contamination include glass manufacture, the alkali industry, copper smelting, town gas works and chemical manufacture. The area also has a number of closed landfill sites which pre-date and are therefore excluded from waste site licensing regime practises. The impact of the mining industry in this area is dealt with elsewhere in Issue 5.

Redevelopment of land provides an opportunity to remediate contaminated sites and the Agency works closely with Local Authorities, developers, and other organisations to ensure that the environment is enhanced by redevelopment. On some abandoned tip sites specialist habitats have developed, which would need careful consideration as part of any remediation work. However, whilst some sites can be addressed this way, this has not proved enough to make more than small inroads into this widespread problem. In some cases serious pollution is occurring a more proactive approach is required.

Full remedial works on contaminated land in general are likely to cost very substantial sums of money. Progress is likely to depend on government policy, and in particular on availability of funding. Often the feasibility of remediation is influenced by the added value conferred on land by remediation and redevelopment. Where a site is not suitable for a high value after use the economics of redevelopment will be hard to resource.

The Environment Agency operates in accordance with the provisions and duties of the Environment Act, 1995. Duties for the Agency and the Local Authorities which include the identification, regulation and remediation of contaminated land. The Agency will have responsibility for Special Sites, following their confirmation by Local Authorities. Those are sites which pose a threat of serious harm or pollution, or present aspects which the Agency may have expertise in dealing with. The Agency is committed to working closely with local authorities to tackle this problem and achieve environmental improvement to reclaim land for beneficial use.

Contaminated land affects not only the water environment but also public health and the hazards associated with landfill gas. The Agency will deal with these problems on a multidisciplinary approach.

Dealing effectively with contaminated land makes unusually heavy information demands. We have historic information such as relating to pollution incidents, industrial processes, historic or illegal tipping. The management of information and the exchange of information with local authorities is an important, on going, task to enable the Agency to fulfill its strategic role.

Issue 4

Effects

Contaminated land is the greatest single cause of degraded water quality in the Sankey area where direct discharges to surface waters are causing acute pollution.

Chronic pollution will also be occurring from more diffuse discharges, however these problems may not be identified where they are massed by other polluting input occurring elsewhere.

Contaminated land affects not only surface waters, but is also known to be affecting groundwaters at some sites.

Watercourses which should be an asset to the amenity of the area have a poor appearance, unpleasant odours, and provide an unhealthy environment with an impoverished ecology and loss of fishery potential.

Contaminated land has a detrimental effect on the resource potential of ground and surface waters.

Contaminated land hinders the Agency in its efforts to promote and improve the amenity and ecological value of this area and in the carrying out of maintenance and flood defence work.

Public health issues including landfill gas.

Water quality on the Sankey area will remain unacceptable until contaminated land is addressed.

Examples

Hardshaw Brook

Millingford Brook

Pendlebury Brook

Rainford Brook

Sankey Brook

Sutton Brook

Tributary of Sutton Brook adjacent rear of Baxters Lane

Tributary of Sutton Brook adjacent rear of St.Helens Hospital

Options	Responsibility	Advantages	Disadvantages
1.Prevent further contamination of land,	Environment Agency, Local Authorities, Occupiers, Developers.	Cost effective. Good Housekeeping.	Investment required in pollution prevention and infrastructure.

Issue 4

2. Promote and advise on redevelopment.	Environment Agency, Local Authorities.	Assist remediation. Land brought into beneficial use.	Pressure for high value after uses which may conflict with other considerations.
3. Undertake detailed investigations and develop a data base of sites.	Local Authority, Environment Agency, Site owner, Developer, Polluter.	Enable a more strategic and proactive approach. Determine required degree of decontamination and identify suitable remediation technique.	Resources required to manage substantial information needs. Cost
4. Initiate and coordinate action over sites.	Landowner, Local Authority, Environment Agency. All interested bodies in public and private sector.	Most serious problems can be tackled. Improved co-ordination of action and communication of concerns.	Cost and Public Funding. Time.
5. Remediation of sites.	Landowner, Polluter. Local Authorities, Environment Agency.	Improvements in water quality. Potential of the site for beneficial use may be greatly enhanced.	Cost. Risk of loss of valuable ecological sites.

Issue 5

CONTAMINATED RUN-OFF FROM SPOIL HEAPS AND DISCHARGES FROM ABANDONED MINES CAUSING POLLUTION TO SURFACE AND GROUNDWATER.

Background

Coal mining has been widespread on the Glaze/Sankey area and has resulted in a legacy of water pollution due to contaminated discharges from abandoned mines and colliery spoil heaps.

Groundwater enters mines and has to be pumped out to enable mining operations to continue. When the mines are closed, however, this water floods the workings and may discharge underground to other groundwater systems or at the surface to watercourses. The chemical nature of such water varies, but a common feature is the presence of a reddish-brown suspension, ochre, caused by the oxidation of iron minerals. Such ochreous suspensions have a high aesthetic impact due to discolouration and also deplete aquatic life by forming deposits on the bed of watercourses. Acidic surface water draining from old colliery spoil heaps can contain considerable amounts of iron and other toxic metals. This contaminated run-off can occur if adequate restoration to reduce the amount of water that percolates through the spoilheap has not been carried out.

Currently, landowners and former operators of abandoned mines causing pollution problems are exempt from key legislative controls and are not liable for clean-up costs. The Environment Act will introduce some improved measures to deal with mines abandoned in the future.

Effects

Increased levels of toxic substances.

Depletion of aquatic communities and loss of potential fishery.

Poor visual appearance and reduction in amenity value.

Rising groundwater levels and potential to mobilise pollutants from contaminated land (Issue 9)

Loss of dilution in some watercourses from pumped minewaters

Examples

Failure to meet objectives (Glaze)

a) Small Brook, a tributary of Westleigh Brook, is contaminated by spoil heap run-off resulting in ochreous discolouration which may contribute to the failure of Westleigh Brook to achieve the water quality RQO.

b) Whitehead (Ellen) Brook and Moss Brook fail to achieve water quality RQOs and biological objectives partly as a result of drainage from Astley Green spoil heaps.

Issue 5

c) Shakerley Brook, a tributary of Hindsford Brook, is affected by spoil heap run-off from Cutacre Tip to such an extent that Hindsford Brook fails to meet long term biological and river quality objectives.

Other examples of mine drainage on this area include Common Lane Brook, Pennington Flash, Chanters Brook and Pen Leach Brook and Hockery Brook.

Failure to meet objectives (Sankey)

a) Clipsley Brook fails to meet long term biological and river quality objectives which may be due in part to a discharge from an abandoned mine to Haydock Sough.

b) Union Bank Brook has its source at the Sutton Manor Colliery site and the ochreous drainage from this site may contribute to the failure to meet long term biological and river quality objectives.

c) Whittle Brook is affected at its headwaters by mine drainage and this may be a factor in the failure to meet biological and river quality objectives.

Other examples of mine drainage on this area include Phipps Brook, Sutton Brook, Down Brook, Millingford Brook, Barkers Brook and Pendlebury Brook.

Options	Responsibility	Advantages	Disadvantages
1. Investigate the potential for resuming the pumping of minewater and treat to required standards	Owner/operator, Other Agencies, Coal Authority.	Improvement of discharge quality. Dilution for other effluents.	Cost to owner/operator. Not enforceable under current legislation.
2. Provision of on-site treatment for minewater drainage	Owner/operator.	Achievement of water quality objectives. Enhancement of fishery and amenity potential	Cost to owner. Difficulty in establishing liability
3. Provision of public sewer connection for minewater drainage	Owner/operator, NWW Ltd.	Achievement of water quality objectives. Enhancement of fishery and amenity potential.	Cost to owner/operator. Difficulty in establishing liability. Dependent on adequate capacity in sewer
4. Restoration and redevelopment of spoil heaps	Owner, Developer, Local Authority.	Achievement of water quality objectives . Enhancement of fishery and amenity potential. Opportunity to reclaim coal from waste spoil.	Cost to owners/developers Affected by the viability of the end use of site.

Issue 6

IMPACT FROM INDUSTRIAL AND TRADING ESTATES DRAINAGE ON SURFACE WATER QUALITY.

Background

The number of industries that discharge waste to the watercourse have reduced significantly over the last two decades. There has, however, been an increase in the number of industrial estates, trading estates and business parks in the area, some are modern, others are part of old factory premises. Most incidents of pollution originating from industry and industrial estates arise from accidents, negligence, poor storage and the mishandling of oil, chemicals and waste.

On modern sites pollution commonly occurs from wrong connections to the surface water drains. These can consist of wash waters, trade effluent, process effluent, contaminated yard washing, kitchen and toilet wastes. Where units have been converted from older premises and sub-let, the drainage systems have not usually been upgraded. These older systems are more prone to blockages and leaks.

Effects on watercourse

Increased biochemical oxygen demand and ammonia levels.
Reduction in dissolved oxygen
Reduction, or in extreme cases the elimination, of aquatic fauna and flora.
Surface films of oil and grease reducing oxygen exchange between air and water.
Sewage litter debris and waste materials detract from the appearance of the watercourse.
Growths of sewage fungus.
Discolouration of the water.
Unpleasant odours.

Failures to meet objectives :-

- a) Clipsley Brook receives the drainage from Haydock industrial Estate which is thought to contribute to the failure of this reach achieving its long term water quality RQO and biological objective.
- b) Thatto Heath Brook is a culverted watercourse linking a series of four dams and eventually joining Hardshaw Brook. The lower two dams receive trade discharges which have an impact on the water quality and in turn on Hardshaw Brook contributing to the significant failure to achieve the long term water quality RQO and Biological objective.
- c) Ellams Brook receives drainage from two industrial estates, Yew Tree Industrial Estate and Boston Industrial Estate. This drainage causes pollution in the brook and contributes to the significant failure to achieve the long term water quality RQO and Biological objective.

Issue 6

Other water quality problems :

Sankey Brook
 Dean Brook
 Garswood Brook
 Millingford Brook
 Phipp's Brook.
 Spittle Brook
 Birchwood Brook
 Astley Brook
 Marsh Brook
 Small Brook

OPTIONS	Responsibility	Advantages	Disadvantages
1. Identify any site drainage problems. Priorities problems and develop a programme of improvements.	Environment Agency, Owners, Occupiers, Local Authority, NWW Ltd.	Increased knowledge on sites and problem areas. Improvement program set up.	Cost to Owners, Occupiers.
2. Rectify identified problems. Installation of a Surface Water Interceptors.	Owner, Occupier, NWW Ltd.	Improvement in water quality and aquatic ecosystem. Improved aesthetic, amenity value and fishery potential. Possible achievement of long term objectives.	Cost to Owners, Occupiers, NWW Ltd.
3. Do Nothing.		Cost saving.	No improvements in water quality.

Issue 7

IMPACT OF URBAN RUN-OFF AND DRAINAGE FROM MAJOR ROADS AND MOTORWAYS ON SURFACE WATER QUALITY.

Background

When the soil is covered with a hard impermeable surface, such as a road, car park or roof rain water can not filter gradually into the earth to feed groundwater or watercourses. This results in an increase in the rate and volume of water going into watercourses via drainage pipes and gullies when it rains. In addition to being a potential flooding problem these stormwaters are often polluted and can cause erosion. The run-off from these areas is contaminated with oils, grease, de-icing materials, sediments and litter. There is also pollution from vehicle exhausts, which studies of road drainage metals such as lead, chromium and nickel have shown to be present in these discharges.

In dry weather a number of watercourses suffer from low flows partially because they are not being recharged naturally. There is also less dilution of pollutants in the watercourse and the wildlife in the river corridor can suffer.

It has been good practice to install interceptors in commercial developments. The Agency now asks for interceptors to be installed on many new road building schemes and some existing roads in order to protect watercourses and special sites. These devices also assist in controlling pollution which may occur following an accident.

In some areas with known flooding problems some method of attenuation is required such as underground storage. Other more ecologically beneficial methods available include stormwater source control, the introduction of more permeable pavements, grass swales and attenuation ponds. These can double up as vegetative treatment systems to control pollution, and can be landscaped into attractive ecological features.

A number of heavily used roads and motorways cross the area including the M6, M62, A570 and A580.

Effects on watercourse:-

- Formation of oil or grease films on the water surface .
- Impact on aquatic fauna and flora.
- Reduction in dissolved oxygen.
- Erosion of watercourse channels.
- Loss of natural re-charge.

Examples :-

In general urban run-off and road drainage is localised, however, on some smaller watercourses there can be a significant impact, these include :

Issue 7

Windle Brook - A580, M62

Clipsley Brook - A580

Spittle Brook - M6

Union Bank Brook - M62

Dallam Brook - M62

River Mersey - M6

Whitehead (Ellen) Brook - A580

Ellams Brook - A49, A580

Millingford Brook - M6

Bickerstaff Brook - M58

Dean Brook - A580

Carr Brook - A580

Astley Brook - A580

Shaw Brook - A580

OPTIONS	Responsibility	Advantages	Disadvantages
1. Identify and priorities problem areas and create a program to rectify them.	Environment Agency, Highways Department, Local Authorities.	Increased knowledge and development of a programme of improvements.	Difficulties in locating problems. Cost.
2. Installation of interceptors or other means of stormwater control, such as swales and attenuation ponds, on new and existing major roads and Motorways.	Highways Agency, Local Authority, Developers.	Protection of aquatic ecosystem and prevention of water quality deterioration. Improvement to the aesthetic and amenity value and fishery potential. Reduction of flood risk.	Cost of installation and maintenance. Additional land requirement.
3. Do Nothing.		Cost savings.	Deterioration of watercourse and water quality.

Issue 8

DIFFUSE DISCHARGES CAUSING POLLUTION TO BOTH SURFACE AND GROUNDWATER.

Background

In many cases water quality problems can be traced to a point source or to a known pollutant. However, on some lengths of watercourse there is biological evidence of pollution which is not picked up by chemical sampling, or chemical sampling can indicate a type of pollutant but the source is unknown or natural.

Diffuse pollution can occur as a result of agricultural practices such as crop spraying, fertilisers and general agricultural practices. These pollutants can enter a watercourse over a period of time as they slowly leach through the ground and are washed off by the rain. The pollutant then gradually accumulates. In many cases they cannot be detected as the amount present is below the analytical detection limit.

Effects on Watercourse

Decrease in the diversity of fauna and flora
Lack of fish

Failures to meet objectives :-

Windle Brook; survey limit to Sankey Brook
Black Brook; survey limit to Thatto Heath.
Marsh Brook; hall Lee Brook to Westleigh Brook.
Brookside Brook; survey limit to Boorsdane Brook.
Carr Brook; survey limit to the Glaze.
River Mersey;

OPTIONS	Responsibility	Advantages	Disadvantages
1. Undertake biological and chemical surveys to identify problem areas	Environment Agency.	Provide information to establish an action plan.	Cost.
2. Encourage farmers to leave a buffer strips along the edge of watercourses where this is a concern.	Environment Agency, MAFF, NFU.	Protection of aquatic environment. Prevention of water quality deterioration. Improvement to the aesthetic and amenity value. Reduction in storm flows.	Loss of productive land. May not be effective where land drains exist. Waterlogging problems.
3. Do Nothing		Save time and resources.	Loss of amenity and habitat.

Issue 9

RISING GROUND WATER LEVELS INCREASING THE RISK OF POLLUTION.

Background

The cessation of minewater pumping, due to the closure of local deep coal mines, together with reduced potable groundwater abstraction, due to poor groundwater quality, has resulted in a rise in groundwater levels.

Effects

Artificially lowered ground water levels will rise with time with subsequent flooding or waterlogging of low lying land, and flooding due to increased surface water run off.

Rising groundwater becoming contaminated.

Flooding of contaminated land.

Mobilisation and discharge of contaminated groundwaters into watercourses.

Damage to aquatic life of watercourses.

Examples

Area Wide

Sankey area north of Warrington.

Options	Responsibility	Advantages	Disadvantages
1. Investigate problem and establish priorities for action.	Environment Agency, NWW Ltd,	Increased knowledge of the problem. Establish action plans.	Costs. Money and powers may not be available.
2. Investigate the feasibility of re-establishing the pumping of groundwater and treating for utilisation for other purposes.	NWW Ltd, Environment Agency, MAFF, Local Authorities.	Alleviates problems associated with rising ground water levels. Improvement of discharge quality. Known discharge points. Water available for recharge, dilution or industrial use.	Costs. Responsibilities not clear. Not enforceable under present legislation.

Issue 9

<p>3. Create wetland habitats in appropriate flooded areas.</p>	<p>Environment Agency, MAFF, NFU, Groundwork, English Nature, Local Authorities.</p>	<p>Increased environmental diversity. Potential for the creation of reed bed habitats that may help to improve water quality.</p>	<p>Cost. Land loss.</p>
<p>4. Do nothing.</p>		<p>No direct cost. Allows development of natural wetland habitat.</p>	<p>Unknown consequences of water table rising. Pollution from abandoned mines</p>

Issue 10

CULVERTS CAUSING FLOOD RISK, POOR WATER QUALITY AND LOSS OF HABITAT.

Background

Many watercourses have been piped underground in culverts beneath roads, tips, fields and buildings. Within the area there are at least 138 culverts totalling approximately 10.4 km in length, a number of these, in particular long culverts through urban areas, have a history of blockages and flooding.

Culverts are a barrier to wildlife. The lack of light and unnatural bed are inhospitable to fish, aquatic plants and invertebrates. Moreover, a fragmented river corridor with artificial gaps in open water, bankside and valley habitats has less identity and is vulnerable to further abuse.

Detection of pollution is difficult in urban areas where long culverts with multiple connections are common. There is an increased risk of wrong connections into the surface water system.

The provision of debris screens on culverts, and regular maintenance to remove debris from the channels has reduced the risk of serious flooding incidents. Additionally, regular inspections of culverts and the removal of obstructions ensures the protection of property against flooding due to blockages. Ultimately the responsibility for maintaining these structures and clearing blockages lies with the riparian owner. However, ownership is not always easy to determine nor is it easy to enforce the clearance of debris screens or culverts when the owner has been identified. Therefore, under its permissive powers the Environment Agency clears some 23 screens within the area, on a best endeavours basis, as resources allow.

In order to maintain existing flood defence standards and protect existing river corridor features the Agency's policy is to object to any new culverting of watercourses except for access purposes and under special circumstances. The Agency also requests that existing culverts are opened up, and landscaped to be an attractive water feature when sites are re-developed. Although it is difficult and expensive to open up culverts when they are deep underground, especially if a valley has been tipped with waste, there are many other culverts that could be opened up for the benefit of wildlife and the local environment. The most suitable culverts are those that flow through uncontaminated green space where the new channel could meander naturally and be landscaped attractively.

Issue 10

Effects

History of blockages and flooding, particularly long culverts in urban areas
Fragmentation and loss of river habitats.
Regular maintenance or de-silting of culverts required.
Regular clearance of screens.
Difficulty in clearing debris from culverts.
Difficulty in investigating and detecting pollution
Increased risk of wrong surface water connections

Examples

This exists throughout the area, but, particular problem are:

Hardshaw Brook through St Helens (culverts have a low capacity).
Millingford, Jack and Down Brooks through Ashton-in-Makerfield town centre.
Chanters Brook, Atherton.
Landside Brook, down stream of Pennington Pumping Station, Leigh.

Examples of rural watercourses where culverted sections may be suitable for opening up.

Pasture Lane Brook
Bawdy Brook
Longborough Brook
Oswalds Brook
Burtonwood Brook

Options	Responsibility	Advantages	Disadvantages
1. Gather information on all culverts. Identify possible river restoration schemes, to open up suitable culverts when opportunities arise.	Environment Agency, Local Authority, Developers, Riparian Owners.	Increased knowledge of the problem and establish priorities. Ready to bid for funding	Cost and availability of resources

Issue 10

<p>2. Promote and carry out a policy that existing culverts should be opened up wherever possible and restored to open river corridors.</p>	<p>Environment Agency, Local Authority, Developers, Riparian Owners, Groundwork trusts.</p>	<p>Restores watercourse to a more natural state and increases recreational and amenity value. Possible improvement in flood protection. Improved pollution detection. Reduction in liability for culverts..</p>	<p>Cost. Restricts land available for development. Possible loss of habitats in culverts.</p>
<p>3. Installation of debris screens and telemetry on culvert entries.</p>	<p>Environment Agency, Local Authority, Riparian Owners.</p>	<p>Reduces risk of blockages within the culverts. Improved response to blockages.</p>	<p>Cost. Need for screen clearing. Increased responsibility.</p>
<p>4. Reduce flows into culverts by attenuating flows, storing waters or providing alternative routes for flood flows.</p>	<p>Environment Agency, Local Authority, NWW Ltd, Riparian Owner.</p>	<p>Reduction in flows entering culverted sections. Reduced flood risk.</p>	<p>Cost. Land take.</p>
<p>5. Do nothing.</p>		<p>No direct cost.</p>	<p>Culverts would deteriorate with increased risk of flooding.</p>

Issue 11

LITTER AND ILLEGAL TIPPING INTO WATERCOURSES CREATING MAINTENANCE AND AMENITY PROBLEMS.

Background

Illegal tipping of shopping trolleys, pallets, domestic waste and other items is a continuing problem within urban areas in particular. Litter is an eyesore, and its presence may encourage further problems. Rubbish tipped in rivers quickly builds up and blocks the flow of water, especially where it becomes trapped within culverts or at bridges. This increases the likelihood of flooding to roads and property.

The Environment Agency supports the Water Watch and Stream Care projects work on waterside rubbish and litter problems. Water Watch identifies sources of waterside rubbish, advises on solid waste management, and encourages involvement by Local Authorities, waterside businesses, schools, voluntary groups and local communities in clearing up and preventing problems recurring. Awareness raising and education of problems caused by rubbish in rivers and canals is also an important part of the Projects's work. Stream Care supports local voluntary action to clean up and care for streams and rivers. Local communities, schools and groups can get help, advice and equipment to carry out a clean up. Groups can also be helped to improve the waterside environment.

The Agency has certain powers of enforcement on both main river and ordinary watercourses, and permissive powers to undertake works within main river watercourses but these powers do not extend beyond the riverbanks. In this respect rubbish problems are tackled, when reported or requested, by the Agency's Enforcement Officer on Main River only and by the Water Watch and Stream Care Projects on all rivers and canals.

Effects

Regular maintenance is necessary to remove debris to maintain standards of flood protection.
Loss of capacity of watercourse due to build up of debris in channels and culverts.
Risk of blockages at screens and inside culverts.
Danger to wildlife, pets and waterside users.
Can attract unwanted pests.
Creates an eyesore and reduces the recreational value of waterside areas.
May encourage further tipping and littering.

Examples

This problem affects the whole area.

Issue 11

Options	Responsibility	Advantages	Disadvantages
1. Do nothing.		No direct cost.	Increased costs from removing blockages. Reduced visual amenity.
2. Regular and consistent clearance of rubbish, debris and litter from the water and its environment to a high standard.	Environment Agency, Local Authority, Local Residents, Voluntary and Schools, Groups with assistance, from Stream Care.	Reduced incidence of flooding from blockage or obstruction of watercourses. Improvement in amenity value of environment. Reduced risk to waterside users.	Cost. Unclear responsibility.
3. Local initiatives to prevent illegal tipping and littering of watercourses.	Environment Agency, Local Authority, Local Residents, Community Groups, Voluntary and Schools, Groups, Water Watch, Police.	Reduction in illegal tipping and littering Increased perception of the value of watercourses. Increased understanding of problems caused by tipping. Increased sense of ownership and the need to care for the environment.	Cost. Initiative must be continued to be effective. Consideration of how work is considered over the long term.
4. Employ litter removal teams.	Environment Agency, Local Authority.	Large amounts of litter would be removed. A resultant increase in visual amenity. Increased perception of value of watercourse.	Cost. Initiative must be continued to be effective. Responsibility for teams.
5. Control of vehicular access to watercourses.	Environment Agency, Local Authorities.	Reduction in illegal tipping into watercourses.	Cost. Reduced public access.

Issue 11

<p>6. Installation of debris screens.</p>	<p>Environment Agency, Local Authorities.</p>	<p>Large amounts of waterborne litter would be removed from rivers, with a resultant increase in visual amenity.</p>	<p>Increased obstruction to flow with increased flood risk. Maintenance costs Increased liability for screen owners.</p>
<p>7. Enforcement of action against littering and tipping to be given greater priority.</p>	<p>Environment Agency, Local Authorities, Police.</p>	<p>Reduction of rubbish and litter in the river environment. Increased awareness of illegality of littering and tipping.</p>	<p>Cost.</p>
<p>8. Prevent development from contributing waste or materials to watercourses.</p>	<p>Environment Agency, Local Authorities, Water Watch, Construction Industry, Owners and Occupiers.</p>	<p>Reduced amount of debris entering the water, reducing blockages in watercourses. Reduced flood defence maintenance costs.</p>	<p>Cost. An on-going process which needs to be built into normal working practice.</p>
<p>9. Target awareness raising of waste disposal services, recycling and waterside rubbish related issues.</p>	<p>Environment Agency, Local Authorities, Water Watch, Mersey Basin Trust.</p>	<p>Improve correct waste disposal. Reduced maintenance costs from reduced tipping in waterside areas.</p>	<p>Diverse responsibility. Consideration of how work is considered over the long term.</p>

Issue 12

MAINTENANCE PROBLEMS CAUSED BY UNSTABLE BANKS.

Background

The geology of the area includes deposits of sand and peat, therefore, bank slips are an on-going maintenance problem. Regular de-silting and re-grading, together with the installation of bed strutting, revetment and bed check works as necessary have been used to maintain adequate flood defence standards throughout the area.

Erosion and bank slips are, however, natural processes which can create variety and diversity in the profile of the bank. This is of benefit to species such as kingfishers and sandmartins which depend on eroding vertical banks for their nest sites. Slumps can form low level wet ledges which may support aquatic plants and invertebrates. Banks can often be stabilized or reprofiled more sympathetically by incorporating features such as ledges and variety in bank slope.

Effects

Slipped materials are washed down stream. This contributes to shoals in areas of deposition. Slips reduce the capacity of watercourses & increase risk of overtopping of banks and flooding. Increased variety in bank profile.

Examples

Sankey Brook upstream of M62.
Causey Brook 1.
Millingford Brook.
Pendlebury Brook 2.
Rainford Brook.
Hey Brook

Pennington Brook
Holcroft Brook
Moss Brook
Moss House Brook
Collier Brook
Dog Pool Brook

Options	Responsibility	Advantages	Disadvantages
1. Identify areas where there is a need to protect banks from erosion.	Environment Agency.	Increased knowledge of the problem.	Cost.
2. Reduce slope and support banks in danger of slipping.	Environment Agency, Riparian Owners.	Reduces the incidence of bank slips. Increased capacity in river channel. Opportunity to enhance bank habitats.	Cost. Increased land take. Potential loss of vertical bank habitat for example for kingfisher and sandmartin.

Issue 12

3. Review present regime and discontinue maintenance where watercourse has stabilised.	Environment Agency, Local Authority, Riparian Owners.	Cost saving from reduction in extent of maintenance regime. Allows development of more natural habitat.	Cost. Public concern at apparent abandonment of watercourses.
4. Investigate and implement more environmentally sensitive methods.	Environment Agency, Local Authority, Riparian Owners.	Increased variety benefits wildlife and fish. More attractive watercourses. Improved amenity value.	Possible extra cost.
5. Carry out works to return channels to more natural section.	Environment Agency, Local Authority, Riparian Owners.	Cost saving due to reduced maintenance costs. Allows development of natural habitat. Improved channel capacity.	Cost. Land take. Insufficient space in urban areas.
6. Do nothing		No direct cost. Protects the natural habitat and regime of the watercourse.	Increased risk of flooding. Increased silt load in watercourse.

Issue 13

POOR ACCESS TO WATERCOURSES FOR MAINTENANCE WORKS AND RECREATIONAL ACTIVITIES

Background

There is poor access to stretches of watercourses at many locations in the area for regular maintenance, emergency works and recreational activities. Access to and maintenance of watercourses in urban areas is often complicated by walls, fences and residential or industrial property being too close to the watercourse. The canals of the area also provide the potential for recreational use on the tow paths, but, access is often restricted.

Where people cannot walk along a watercourse it can become neglected and undervalued, particularly in urban and urban fringe areas. As well as looking unattractive, development to the bank top leaves no habitats for wildlife. Linear green space along watercourses can act as a buffer against damaging activities as well as being used for recreational and maintenance access.

The Environment Agency has powers, under its byelaws, to control works and development within 8m of the top of the bank on Main Rivers. Through the planning process the Agency has a lesser influence on development on land adjacent to ordinary watercourses and land beyond 8m on Main River. The construction of suitable accesses into, and along inaccessible watercourses is required to reduce the costs incurred in hand maintenance, and to improve the Agency's response to flooding situations. These works may take the form of access ramps or tracks.

Effects

- Reduced efficiency in maintenance of watercourses in residential areas.
- Access to blockages unavailable or difficult in flood situations.
- Uneconomic use of resources to carry out maintenance works.
- Irregular but extensive maintenance of watercourses.
- Poorly maintained stretches of watercourse reduce overall standards of flood protection.
- Lack of amenity use of watercourses
- Unattractive and undervalued watercourses.

Examples

This problem occurs in many places across the area.

Options	Responsibility	Advantages	Disadvantages
<p>1. Provide and enforce access strips along watercourses through the development control process, land drainage byelaws and by encouraging Local Authorities to take a similar stance.</p>	<p>Environment, Agency, Local Authority, Riparian Owners, Developer.</p>	<p>Provides access to watercourses for maintenance works. Provides buffer strips along watercourses. Improved access at no extra cost to Agency.</p>	<p>Objections from riparian landowners & developers. Security of waterside properties reduced. May increase risk of tipping and littering. Access structures can be visually obstructive.</p>
<p>2. Purchase of specialised maintenance equipment to work in restricted areas.</p>	<p>Environment Agency.</p>	<p>May enable more efficient working.</p>	<p>Cost. Specialised equipment may not be fully utilised.</p>
<p>3. Identify where improvements to public access to watercourses are necessary and encourage the creation and extension of linear parks.</p>	<p>Environment Agency, Local Authority, Landowners.</p>	<p>Improves the public perception of the value of the water environment. Allows public more access to enjoy rivers and the water environment.</p>	<p>Land take. Maintenance. Security of waterside properties.</p>
<p>4. Increase awareness within the public of the existence, nature and purpose of the watercourses.</p>	<p>Environment Agency, Local Authority, Schools, Groundwork Trusts.</p>	<p>Increased public knowledge of the environment and its uses.</p>	<p>Cost.</p>
<p>5. Do nothing</p>		<p>No additional cost.</p>	<p>Poor utilisation of resources. Infrequent maintenance.</p>

Issue 14

IMPACT OF RESIDUAL EFFECTS OF MINING SUBSIDENCE ON FLOOD RISK.

Background

Although deep mining in the area has now ceased, subsidence due to extensive mining in the past has left a legacy of deepened and regraded watercourses within the area. Localised subsidence depressions have either been allowed to flood, forming the features known locally as 'Flashes', or have been artificially drained by pumping to prevent flooding of land and property, as at the Bedford pumping station in Leigh.

The Environment Agency presently carries out reactive works, pumping and a heavy maintenance programme, as the artificially constrained water environment must be maintained to continue the present levels of flood protection and land drainage within the area. Measures used by the Agency may include extensive revetment, bed strutting and bed check works. However these works have a direct environmental impact on the watercourse, and will in time require replacement.

The Agency will shortly carry out new flood protection works along Pennington Brook, down stream of Pennington Flash. These works are to be funded by the Coal Authority.

Effects

Deepened and steeply sided channels.

Extensive revetment to prevent erosion of the artificial channels.

Subsided and low lying land at risk of flooding.

Bed strutting and bed check structures to maintain shape and gradient of watercourses.

Continuing maintenance regime to maintain present levels of protection against flooding.

Pumped or flooded areas

Examples

Croftheath Brook.

Ellams Brook.

Sankey Brook.

Hardshaw Brook.

Sutton Brook.

Sutton Mill Brook.

Burtonwood Brook

Phipps Brook

Pendlebury Brook.

Bickerstaff Brook.

Westleigh Brook

Pennington Brook

Jennets Lane Brook

Bedford Brook

Pumped Areas

Bedford Pumping Station

Jennets Lane Pumping Station

Pennington Pumping Station

Pendlebury Pumping Station

Issue 14

Options	Responsibility	Advantages	Disadvantages
1. Review present regime and discontinue maintenance where watercourse have stabilised.	Environment Agency, Local Authority, Riparian Owners.	Cost saving from reduction in extent of maintenance regime. Allows development of more natural habitat.	Cost. Public concern at apparent abandonment of watercourses.
2. Investigate and implement more environmentally sensitive protection measures, returning channels to more natural sections.	Environment Agency, Local Authority, Riparian Owners.	Increased variety benefits wildlife, looks more attractive and improves recreational and fisheries potential. Reduction in maintenance costs.	Cost. Public concern at apparent reduction in maintenance of watercourses. Land take. Insufficient space in urban areas.
3. Do Nothing		No direct cost. Rivers return to more natural regime.	Increased risk of flooding due to channel blockage or erosion.

Issue 15

SILTATION CAUSING FLOOD RISK.

Background

In the Sankey area sand and silt washed from the upper rural reaches causes problems where it forms shoals within channels in the lower urban areas. A program of regular de-silting along the water courses is currently carried out to prevent flooding. The construction of silt traps has been considered, to reduce the quantities of sand and silt carried downstream into the urban areas, in order to prevent shoals forming in culverts or channels, and to reduce the risk of flooding to property.

These silt traps, which may take the form of on line ponds or concrete boxes, would be located at suitable points upstream of urban areas to collect sand and silt as it is washed down the watercourse. There is some risk that removal of material upstream would prevent the beneficial effects of natural erosion and deposition where they are of value to wildlife: for example from variety in channel habitat, shoals or marginal ledges. However, removal of sand and silt is easier if more localised and therefore less disruptive to the wider environment than the present heavy maintenance regime.

Effects

Deposition of sand in urban channels and culverts reduces capacity and increases the risk of flooding.

Regular heavy maintenance works causes extensive disruption of watercourses.

Examples

Hardshaw Brook

Rainford Brook

Windle Brook

Issue 15

Options	Responsibility	Advantages	Disadvantages
1. Construct silt traps to catch sand at appropriate locations.	Environment Agency, Local Authority, Developers.	Allows sand and silt to be collected and removed more effectively. Reduced costs in removing sand and silt deposits within urban areas. Reduced impact on wider watercourse habitat.	Cost of constructing and maintaining silt traps. Environmental impact of structures. Unknown effects on channel habitats downstream of limiting natural deposition.
2. Identify and control sources of sand entering watercourses.	Environment Agency, Local Authority, Riparian Owners.	Reduces need to remove sand lower down the catchment.	Cost. May not be possible to enforce, if sand is due to natural erosion. May result in a reduction in variety of channel habitat
3. Do nothing.		No direct cost.	Increased deposition of sand increases the risk of flooding to property.

Issue 16

LACK OF SUSTAINABLE FISH POPULATIONS

Background

Water quality within the Sankey/Glaze area is poor, and therefore, the watercourses cannot sustain coarse fish populations. A substantial improvement in the water quality of the watercourses within the area would mean that there would be habitats suitable for Brown Trout in the upper reaches of the area and coarse fish throughout the rest of the area.

Effects

The establishment of good coarse fisheries and their sustainability will depend on water quality improvements.

Option	Responsibility	Advantages	Disadvantages
1. Stock with fish as water quality improves sufficiently to maintain a coarse fish population (ie RE4).	Environment Agency Angling Clubs	Development of coarse fishery.	Cost.
2. Do nothing		No cost	Lack of fish population and amenity value.

Issue 17

LACK OF WATER ASSOCIATED RECREATION AND AMENITY SITES.

Background

Public open space adjacent or close to watercourses is of particular amenity value in urban areas and provides informal access to the water environment for a wide range of people. Whilst several rivers are open to the public, for example Sankey Valley Park, Padgate and Spittle Brooks in Warrington, there are further opportunities for providing or upgrading public access within the area, including interpretation, signage, seating and landscape improvements. Some opportunities have been highlighted by the Sankey River Valley Initiative and by the North West Council for Sport and Recreation.

The provision of formal water based recreational activities such as canoeing will be restricted by water quality. Access to rivers and stillwaters is controlled by the landowners, except where public footpaths or bridleways exist. There is no legal right to navigate along rivers except in estuarine waters or where a right of navigation has been established. The Agency is keen to promote recreational activities which sit amicably alongside conservation interests. Access is a sensitive issue which requires any specific proposal to be fully debated by interested parties.

The Agency's aim is to work in partnership with public, voluntary and private sectors to promote attractive rivers, ideally set within continuous, open corridors linking urban population centres to the countryside. Opportunities for improvement are achieved through the activities of third parties, by the Agency working with local authorities and developers, and work undertaken as part of the Agency's capital and maintenance programmes.

Effect

The current provision of pleasant riverside access and sites for formal water recreation close to urban centres does not always meet the demand. This causes pressure on the existing sites and also results in people having to travel to alternative sites.

Lack of access in urban areas may create rivers which are uncared for and littered.

Examples

Newton Brook
Mill Brook
Woolston Weir
Sankey canal
Newton Brook
Glaze Brook

Issue 17

Option	Responsibility	Advantages	Disadvantages
1. Carry out survey of existing sites and demand, to assess the need for water based recreation sites.	Environment Agency, Local Authorities, Sports Council.	Provide information on what is required to meet demand.	Cost
2. Develop recreational plan.	Environment Agency, Local Authorities, Sports Council, Landowners.	Provide facilities that meet demand.	Cost. Landowners consent required.
3. Do nothing.		No cost.	Under utilised recreational potential and unsatisfied demand.

Issue 18

EXTENT OF CHANNELIZED AND OVER-MANAGED WATERCOURSES CREATING LOSS OF HABITAT AND AMENITY.

Background

A high percentage of watercourses in the area have been artificially channelised, straightened, deepened and shortened. Land next to urban watercourses has often been developed to the bank top. Banks have been reinforced or reprofiled to prevent natural erosion and meandering and relatively few river corridor habitats have been left undamaged. Rural watercourses have been modified to create more land for agriculture and to drain the land more effectively. Long lengths have been embanked to prevent flooding. Flood banks are often so close to the watercourse they are revetted at the bank toe to prevent undermining, reducing marginal and channel habitats.

The Environment Agency, through its activities as a statutory consultee, works to retain those stretches of watercourse and river corridor which retain natural variety, for example, a meandering course, gravel shoals and pools, bankside trees, woodlands, wetlands and grasslands. We also seek to integrate buffer zones in new development sites.

It is possible to enhance some of the degraded watercourses by, for example, tree planting, creation of two stage channels, planting water plants, re-instatement of riffles and pools or raising of bed levels. In some areas it may be appropriate to restore meandering, semi natural watercourses with floodplain habitats. This would involve considerable earth moving and requires uncontaminated adjacent land. However, a river restoration scheme has already been carried out on a stretch of Whittle and Padgate Brooks by the NRA.

Effects

Artificially channelised watercourses reduce the physical variety in the channel, banks and adjacent land. There is less potential habitat for wildlife due to the loss of meanders, vegetated and unvegetated marginal habitats, shoals, riffles, pools, eroding banks, terraces, oxbows and valley landforms and there is less biodiversity due to a lack of bankside trees and plants, marginal and channel vegetation.

They are less attractive watercourses for people to enjoy. Aesthetically they are un-interesting, are less valued and need to be heavily maintained to retain their straight uniform profile. Where development has taken place very close to the bank top people may not even know a water course exists.

Examples

River Glaze - Pennington Flash to Manchester Ship Canal
Dog Pool Brook
Bedford brook - Hindsford to Moss brook
Westleigh Brook - at Pennington golf club

Issue 18

Moss brook System
 The Sankey
 Sutton Mill brook
 Sutton Brook
 Penketh brook
 Millingford brook
 Padgate brook

Options	Responsibility	Advantages	Disadvantages
1. Identify stretches suitable for enhancement and restoration.	Environment Agency, Local Authorities, Groundwork Trusts, Landowners, Mersey forest, Forestry Authority,	Be able to prioritise, appreciate full scale of problem and most effective way addressing it.	Extent of contaminated land. Cost.
2. Implement enhancement and restoration schemes.	Environment Agency, Local Authorities, Groundwork Trusts, Landowners, Mersey forest, Forestry Authority.	Improve appearance and wildlife value of river corridors.	Cost. Extent of contaminated land. Unpredictability of funding sources. May increase maintenance costs.

Issue 19

INTENSIVE CULTIVATION OF LAND TO THE EDGE OF WATERCOURSES INCREASING THE RISK OF POLLUTION AND LOSS OF HABITATS.

Background

Many waterside fields are ploughed and cultivated to the very top of the bank leaving no buffer against spray drift, run-off, disturbance, loss of habitat and erosion.

Nitrogen, in particular can be removed from field run-off and drainage by passing through vegetated buffer strips. Removal of Phosphorous is less successful. To be most effective strips should extend along ditches feeding larger watercourses and around ponds. The efficiency of these strips is reduced if land drains are present and continue to flow direct to the watercourse.

A bank protected by natural vegetation is likely to be more stable. The roots of permanent vegetation can resist excessive erosion which may cause damaging siltation downstream. Natural erosion and deposition still occur but the need for bank revetment is reduced and a brook can meander through uncultivated land without fear of viable land loss.

There is potential to improve the wildlife value of river corridors by creating or leaving uncultivated strips. These strips could be, unfertilized seasonally grazed grassland, tall unmanaged grassland in which natural tree and shrub regeneration could take place, grassland managed for butterflies or small mammals, riverside forests, hedges or wetlands. The latter can be effective filtration if created to take the discharge from field drains.

Farmers can be compensated for the loss of land in creating waterside strips by entering the Countryside Stewardship Scheme of the Waterside Fringe Habitat Creation Scheme. Grants for farm woodlands are also available.

Effects

If a field is cultivated to the edge of the watercourse there is a high risk of pollution from farming activities such as the spreading of pesticides, fertilisers and slurry.

Run-off rich in nutrients from fertilisers causes problems of eutrophication in brooks, ditches and ponds. There may be plentiful growth of algae and a reduction in oxygen levels and species diversity.

Many rural watercourses have limited wildlife habitats along them because there is no semi-natural corridor.

Excessive erosion can cause damaging siltation of gravel beds downstream. It can also reduce capacity in urban channels.

Drainage is not attenuated or slowed down.

Issue 19

Examples

Black Brook
 Rainford Brook
 Windle Brook
 Union Bank Brook
 Glaze Brook
 Dog Pool Brook
 Bedford Brook
 Moss Brook

Options	Responsibility	Advantages	Disadvantages
1. Identify and target watercourses where uncultivated strips would be most beneficial.	Environment Agency, MAFF, Local Authorities, Forestry Authorities, Community forests, Wildlife groups.	Be better able to target grants and resources.	Most rural watercourses would benefit.
2. Identify Landowners willing to create uncultivated strips along watercourses.	Landowners, NFU, Environment Agency, MAFF, FWAG, Local Authorities, Forestry Authorities, Community forests, Wildlife groups.	Be in a position to cost and implement effective initiatives.	Number of Landowners and diversity of opinion.

Issue 19

<p>3. Create uncultivated buffer strips along targeted watercourses.</p>	<p>Environment Agency, MAFF, FWAG, Local Authorities, Forestry Authorities, Community forests, Wildlife groups.</p>	<p>Prevent diffuse pollution. Improve wildlife corridor value of watercourses. Rivers allowed to meander naturally-avoid need for revetment. Prevent excessive siltation. Slow down or attenuate run-off. Reduced flood peaks. My increase groundwater recharge.</p>	<p>If field drains do not drain directly into watercourses land may not drain as effectively.</p> <p>Less land available for agriculture.</p> <p>Access difficulties.</p> <p>Increased maintenance cost.</p>
<p>4. Do nothing.</p>		<p>No cost</p>	<p>No improvement.</p>

Issue 20

THREATS TO THE HABITATS OF GREAT CRESTED NEWTS

Background

The Great Crested Newt. (*Triturus cristatus*) is the most aquatic of British newts, breeding in still or slow flowing waters. It tends to be found in water bodies with large amounts of fringing submerged vegetation, but, also with open, relatively deep centres. It is the rarest newt in Britain and is declining at a faster rate than any other amphibian. Great Crested Newts require a surprising amount of land around a pond on which to find food and shelter. It seems that a hectare of good habitat is only enough to support 250 adult newts, less than half a hectare, even of ideal habitat, is unlikely to sustain a viable population. Without a good mix of suitable linked habitats, the newt population will dwindle or vanish, even though it is totally protected by the Wildlife and Countryside Act, 1981.

Ponds in the Wigan area provide the European stronghold for Great Crested Newts, with over 100 ponds known to be used by them (42 of these are also designated Sites Of Biological Interest (SBIs)). Changes in land use, for example, development and intensification of agriculture, within the area, have led to the loss of ponds and wetland habitats. It is, therefore, essential to ensure their survival at existing known sites and also to look at ways of enhancing suitable additional sites for further colonisation.

Effects

Loss of ponds and associated habitats for amphibians.

Encroachment of development up to pond edges which leads to the loss of over-wintering habitats.

International decline in population.

Example

Hoskers Nook, Westhoughton.

Hall Lee Brook area, (Daisy Hill)

Cunningham Brook area

Chanters Brook area

Options	Responsibility	Advantages	Disadvantages
1. Expand the knowledge of existing sites and habitat requirements.	Environment Agency, Wildlife Trust, English Nature.	Build up a better knowledge of habitats and species requirements.	Resource Implications.

Issue 20

2. Formulate an action plan to protect existing sites and enhance suitable areas.	Environment Agency, Wildlife Trust, English Nature, Local Authorities, Local Conservation Groups.	More structured approach.	
3. Do nothing.		No cost.	Loss of habitat. Decline of species.

Issue 21

INVASIVE ALIEN PEST SPECIES

Background

Many foreign plants were introduced to Britain in the 19th century, mainly for ornamental reasons. A few grow very strongly in the wild and have come to dominate river banks. Japanese knotweed and Himalayan balsam are widespread in the area, particularly where land has been disturbed. The NRA has, in the past, sprayed Japanese knotweed in the Sankey area but this does not take place at present.

Effects

They out compete native species.

When they die down in the winter river banks can become unstable.

Giant Hogweed poses a serious health hazard but we do not know if it is a problem in the area.

Options	Responsibility	Advantages	Disadvantages
1. Investigate the extent of Japanese Knotweed, Himalayan Balsam and Giant Hogweed in the area.	Environment Agency, Local Authorities, Ranger services, Landowners.	Scale of problem identified and control programme initiated.	Large area to cover. Resources.
2. Carry out control programme.	Environment Agency, Local Authorities, Ranger services, Landowners.	Control further spread. Improve habitat for native species.	Possible re-invasion. Other vegetation is lost when spraying mixed stands.

Issue 22

THE PRESENCE OF BLUE/GREEN ALGAE IN PENNINGTON FLASH LEADING TO PUBLIC HEALTH AND AMENITY PROBLEMS.

Background

Pennington Flash is used for fishing and water sports, however problems associated with nutrient enrichment have led to the periodic growth of Blue/Green algae. This results in a pea-green discolouration of the water which can prove to be poisonous to humans and pets. In such cases warning notices have to be erected and instructing the public to avoid contact with the water. Lack of information as to the cause of the enrichment adds to the problem although it is currently subject to an ongoing investigation.

Effects

A reduction in the amenity value of the flash.

Options	Responsibility	Advantages	Disadvantages
1. Investigate reasons for the poor water quality	Environment Agency, Local Authority, NWW Ltd.	Better understanding of the problem	Cost
2. Formulate an action plan to combat the problem	Environment Agency, Local Authority, NWW Ltd.	Enable effective targeting of resources	Cost
3. Pursue actively recommendations	Environment Agency, Local Authority, NWW Ltd.	Increase amenity value of the flash	Cost
4. Do nothing		No cost	Increase in nutrient enrichment and problems associated with Blue/Green algal growth.

Issue 23

LACK OF KNOWLEDGE OF THE EXTENT OF USE OF WOOLSTON FISH PASS BY MIGRATING FISH

Background

A fish pass has been constructed, with advice from the NRA, by the Manchester Ship Canal Company (MSC) as part of the new Woolston weir. No work has been able to be carried out to assess its efficiency. The pass has an inherent problem with blockages caused by debris and it is thought that a deflector is needed to keep the debris out of the fish pass. A sluice system could be installed to enable the pass to be used as a fish trap to establish the extent of use by migrating fish.

Effects

It is necessary to assess the effectiveness of the fish pass so that any changes that are needed can be carried out to prevent the weir becoming a barrier to migratory fish.

Option	Responsibility	Advantages	Disadvantages
1. Construct a sluice gate at the upstream end of pass.	MSC. Environment Agency.	Enable blockages to be cleared. Enable the pass to quickly be converted to a trap.	Cost to MSC.
2. Do nothing.		No cost.	Weir may be acting as a barrier to migrating fish.

Section 4

APPENDICES

This section provides supporting information to the Issues and details the current uses and targets for the area and its resources, together with a description of the Agency's responsibilities.

4.1.1 Effluent Disposal

General

This use principally relates to the disposal of domestic and industrial effluents to watercourses. Dependent on the nature of the effluents, they may be discharged continuously or intermittently.

Continuous Effluents

Fully treated effluent from sewage treatment works and trade effluent treatment plants are continuous discharges.

The more significant sewage treatment works are operated by water companies, in this case North West Water Ltd (NWW Ltd). Such sewage works may receive both domestic and industrial waste. Houses and other premises remote from the sewerage network may use an individual sewage treatment plant with a discharge to watercourse as an alternative to septic tank or cess pit as a means of disposal of foul drainage.

Industrial premises treat their trade waste at their own treatment facility with a discharge to a watercourse.

The quality of such continuous effluents is controlled by consents issued by the Agency.

Intermittent Effluents

The most significant intermittent effluents, in terms of impact on water quality, are from combined sewer overflows (CSOs) on the sewerage network. Intermittent discharges may also occur in the event of an malfunction at a pumping station on the sewerage network. Both these types of discharge are the responsibility of NWW Ltd. and the circumstances under which they are permitted to occur are controlled in consents issued by the Agency.

EU Directives

Two Directives issued by the EU have direct implications for water quality in the Glaze/Sankey area.

a) Directive on Dangerous Substances in Water

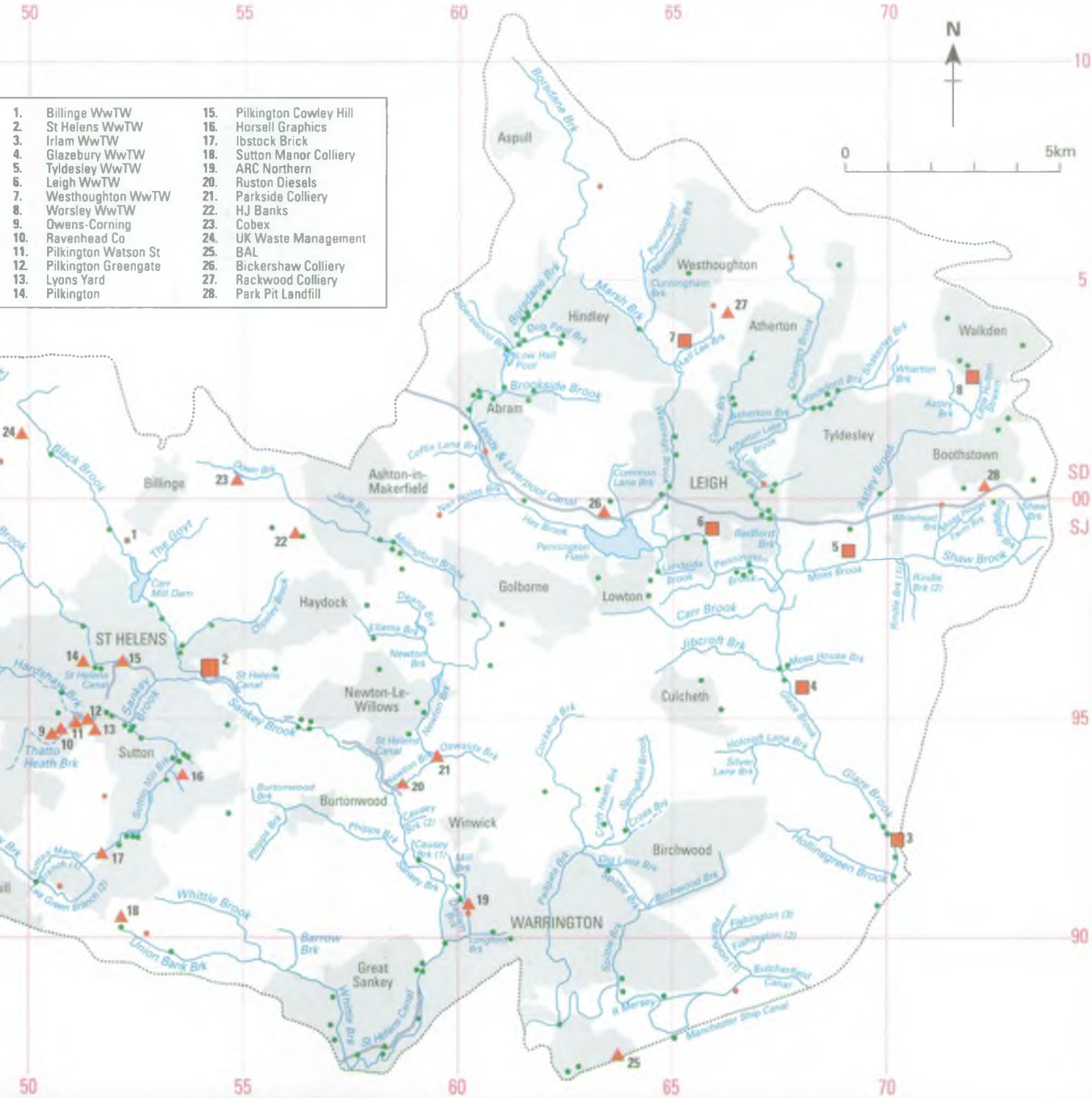
The Directive provides a frame work for measures to control water pollution caused by discharges of certain dangerous substances sub-divided under List I and List II. Member States are required to take steps to eliminate pollution by List I substances and reduce pollution by List II substances.

In the UK Environmental Quality Standards (EQSs) have been established for concentrations of these substances in watercourses. Limits for discharges containing the substances have been set according to dilutions available.

**Sankey/Glaze
Local Management Plan
Map 10**



ENVIRONMENT AGENCY



1. Billinge WwTW	15. Pilkington Cowley Hill
2. St Helens WwTW	16. Horsell Graphics
3. Irlam WwTW	17. Ibstock Brick
4. Glazebury WwTW	18. Sutton Manor Colliery
5. Tyldesley WwTW	19. ARC Northern
6. Leigh WwTW	20. Ruston Diesels
7. Westhoughton WwTW	21. Parkside Colliery
8. Worsley WwTW	22. HJ Banks
9. Owens-Corning	23. Cobex
10. Ravenhead Co	24. UK Waste Management
11. Pilkington Watson St	25. BAL
12. Pilkington Greengate	26. Bickershaw Colliery
13. Lyons Yard	27. Rackwood Colliery
14. Pilkington	28. Park Pit Landfill

Effluent Disposal

KEY

- Catchment Boundary
- Watercourse
- - - - - Culverted Watercourse
- Canal
- Built up Area

WSC STW

- Small (DWF<10MI/d)
- Medium (DWF>10MI/d)
- Large (DWF>50MI/d)

**SEWER OVERFLOWS:
(Storm and emergency)**

- Location of Single Overflow
- Concentration of Overflows
- ▲ Trade Effluent Discharge

4.1.1 Effluent Disposal

There is one sample site on the River Glaze for List I substances, this is prior to the confluence with the Manchester Ship Canal, and sites on the Sankey and the Mersey at Howley, where List I and List II substances are sampled.

There are no Agency consented discharges containing dangerous substances in the Glaze/Sankey area.

b) Directive on Urban Wastewater Treatment

The Directive specifies requirements for the collection and treatment of industrial and domestic wastewaters at sewage treatment works and for treatment of wastewater from certain sectors of industry prior to direct discharge to watercourses.

The directives interpretation in the UK will mean that nearly all significant inland WwTW will already comply with all the requirements relating to treatment.

From the Directive the requirements for collecting systems (the sewerage network) is that they shall be designed, constructed and maintained in accordance with best technical knowledge not entailing excessive cost, specifically regarding the limitation of pollution of receiving waters, due to storm (and emergency) overflows. This presents a very significant objective to be met. A number of overflows have been identified within the Sankey/Glaze area with regard to this requirement.

Standards for the appropriate level of treatment are currently being developed for direct discharges from specified sectors of industry. It is unlikely that any of the direct discharges of industrial effluent within the area will be affected by this requirement

Local Perspective

There are eight major NWW Ltd. Wastewater Treatment Works (WwTW) within the area, these are listed below:

Leigh	Westhoughton
Glazebury	Worsley
Irlam	St.Helens
Tyldesley	Billinge

Approximately 200 CSOs have been identified in this area. The locations of the identified CSOs are shown on **map 10**.

4.1.1 Effluent Disposal

Asset Management Plan 2 (AMP2)

The Asset Management Plan, of which this is the second, is the Water Company's Programme of expenditure and investment for the ten year period between 1995 and 2005.

The Environment Agency is involved in setting priorities for work necessary for environmental improvements. The environmental related work for the first five years of the programme has been confirmed. However, although schemes have been identified for the second five year period, between 2000 and 2005, they are still open to negotiation, and reprioritisation, according to what are deemed to be the most environmentally beneficial projects.

AMP 2 programme 1995 - 2000

Within the Sankey/Glaze area work to improve unsatisfactory combined sewer outfalls will be undertaken in the areas of Platt Bridge, Hindley, Aspull, Boothstown, Salford West, Golborne and Ashton in Makerfield (**list in Appendix 4**).

Improvements have also been proposed with regards to Worsley, Irlam and Westhoughton WwTW.

AMP 2 programme 2000 - 2005

In the second five years of the AMP2 process unsatisfactory combined sewer overflows in Leigh, Glazebury, Atherton, Salford West, Tyldesley and St Helens have been proposed for improvement (**list in Appendix 4**).

**Sankey/Glaze
Local Management Plan
Map 11**

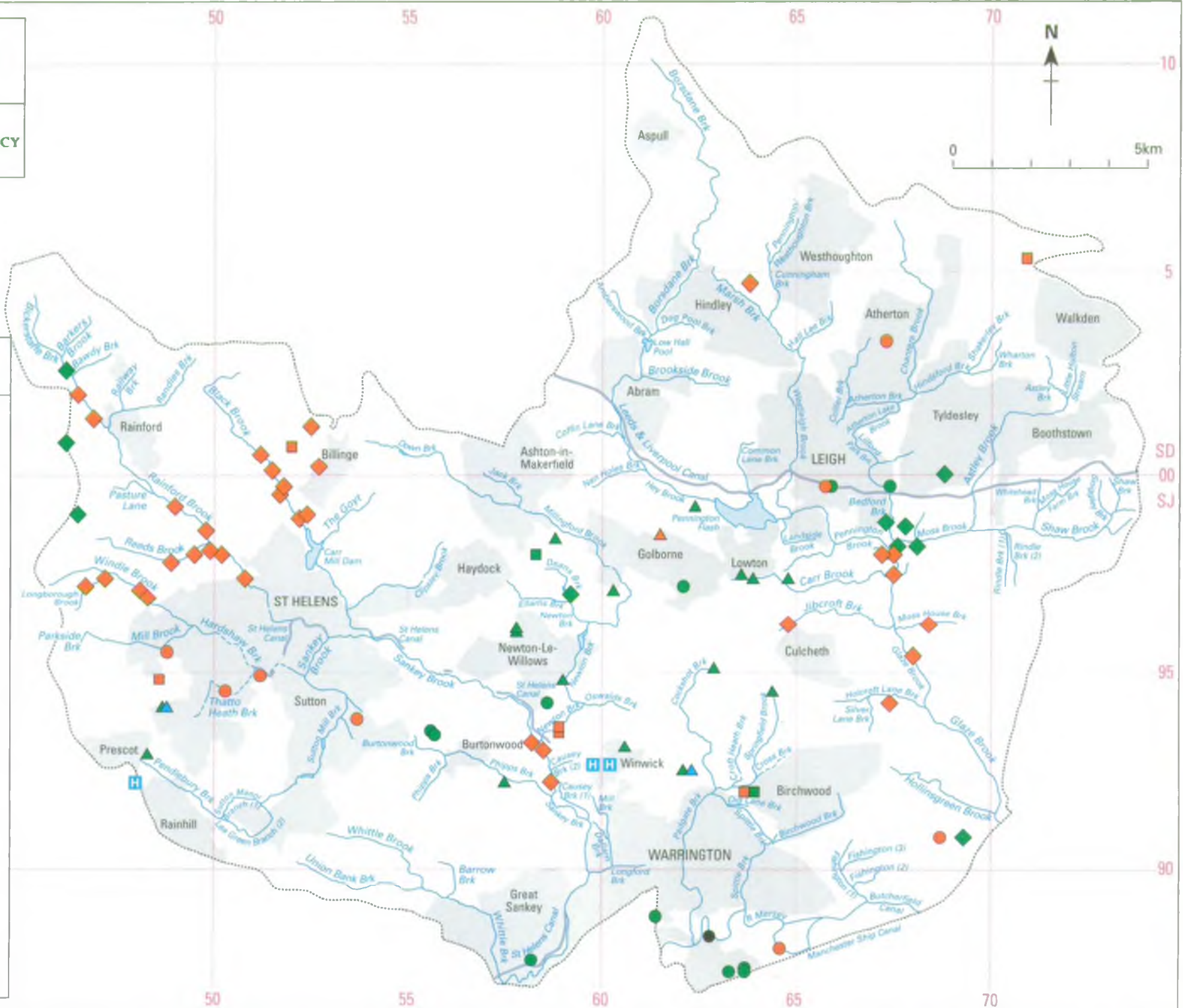


ENVIRONMENT AGENCY

5

Licensed Abstractions

- KEY**
- Catchment Boundary
 - Watercourse
 - - - - - Culverted Watercourse
 - Canal
 - Built up Area
- INDUSTRIAL ABSTRACTION:**
- Surface Water
 - Groundwater
- AGRICULTURAL ABSTRACTION:**
- ◆ Surface Water
 - ◆ Groundwater
- WATER SUPPLY:**
- ▲ Borehole
 - ▲ Well
 - ▲ Shaft
- AMENITY:**
- Surface Water
 - Groundwater
- OTHER ABSTRACTIONS:**
- NWW
 - Ⓜ Hospitals (Groundwater)



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4.1.2 Water Abstraction - Surface Water And Groundwater

Potable (Drinking) Water Supply

Surface Sources

There are no licensed surface water sources authorised for public water supply within the area.

Groundwater Sources

There are eleven licensed groundwater sources used for public water supply within the Sankey area. However, recent reductions in abstracted volumes primarily due to poor groundwater quality have resulted in a rapid recovery of groundwater levels, particularly to the north of Warrington.

There are five licensed groundwater sources used for public water supply within the Glaze area all relating to boreholes situated around the Lowton and Golborne area. Also the recent reductions in the actual abstraction from boreholes to the north of Warrington have seen a rise in groundwater levels within the Glaze area.

The Carboniferous sandstones are capable of supporting small scale agricultural supplies. The Sherwood Sandstone (Permo Triassic) is also used by private domestic abstractors, particularly around the Moss Brook area. These private supplies are generally exempt from licensing requirements. There is potential to consider new applications in this area, provided that they are away from the public water supply boreholes and would not affect water interests and features which are dependant on high groundwater heads, for example, the mosses.

Groundwater Quality

Groundwaters associated with the Carboniferous strata tend to have relatively high dissolved iron contents, especially in old underground mine workings. They may also have been adversely affected by contamination from old industrial activities, for example, around St. Helens.

The major Sherwood sandstone (Permo-Triassic) aquifer generally contains high quality groundwater except where:

- naturally occurring old saline groundwaters occur at depth (encountered in boreholes around Warrington and Croft)
- poor quality (saline) groundwater is present near to and beneath the Mercia Mudstones
- poor quality water intrusion from the Manchester Ship Canal and River Mersey around Warrington
- it has been subject to contamination from past and present land usage, both in urban and agricultural areas where low permeability drift cover is absent.

4.1.2 Water Abstraction - Surface And Groundwater

Groundwater Protection

Groundwater is a vital natural resource and under particular threat from the effects of human activity. Once polluted, groundwater is often difficult and very expensive to clean up, consequently the prevention of groundwater contamination is a major objective of the Agency.

The Agency's "Policy and Practice for the Protection of Groundwater" classifies groundwater vulnerability according to the nature of the overlying soil cover, the presence and nature of any drift cover, the nature of the strata and the depth to the water table.

The policy uses the concept of protection zones around sources of supply (wells, springs and boreholes) based on either distance or time of travel. Protection zones have been established for 87 North West Water Limited public supply sources within the North West Region. Work is currently ongoing to cover the remaining major public supply boreholes and certain critical private supplies.

It emphasises the need to protect all groundwater, whether or not currently developed.

Industrial Abstractions

Within the Sankey area there are twelve licensed abstractions relating to a variety of industrial uses. Nine of these are from groundwater sources. Abstractions are generally small scale and in water resource terms the area is under utilised.

Within the Glaze area there are only three licensed abstractions for small scale industrial use, two from borehole sources and one from a small surface water reservoir. In water resource terms the area is under utilised and depending on the exact location, it may be possible to consider additional abstraction from surface water sources within the area. Despite being generally under utilized, significant volumes of groundwater could potentially be obtained from old mine workings, albeit of poor quality (ochreous). This is particularly relevant now mine dewatering has ceased following closure of all deep mines in the Lancashire coal field.

Abstractions for General Agriculture

The aquifer formed by the Sherwood Sandstone (Permo Triassic) is exploited to provide agricultural water supplies around Moss Brook in the Glaze area. The Carboniferous sandstones are capable of supporting small scale agricultural supplies, whilst the Mercia Mudstones are generally of low permeability but may be capable of yielding limited quantities of groundwater.

There are also surface water sources used within the area, for domestic and agricultural purposes, that are exempt from licensing requirements.

4.1.2 Water Abstraction - Surface And Groundwater

Abstractions for Spray Irrigation

There are seventeen licences authorising use for spray irrigation within the Sankey area, mainly from surface water sources. Of these, five are for golf course irrigation and the remainder are for crop irrigation, mainly in the Rainford and Crank areas.

Within the Glaze area there are eight licences authorising use for spray irrigation, also mainly from surface water sources. Of these, four are for crop irrigation and four for golf course and garden centre nurseries.

In water resources terms, the area is under utilised.

Hydro Power (including Mill Rights)

There are no licensed abstractions for this purpose and none proposed within the area. The low gradient and flow rates in the area make it unsuitable for this use.

Fish Farming

There are no licensed abstractions for this purpose within the area.

4.1.3 Water Resources

Hydrometry. General

Hydrometry is defined as the measurement of water. Hydrometric information is used within the Environment Agency :

- as a basis in the management of water resources
- in flood forecasting and in the design of flood defences
- to set water quality standards for both rivers and groundwater and to protect and help improve fisheries

Local Hydrometric Objectives

The hydrometric information gathered in the Sankey/Glaze area has two principal uses within the Agency:

- First to provide warning of potential flooding in the Warrington area by monitoring levels and rainfall in the area.
- Secondly to provide river level information for water quality management for the partially industrialised Sankey area and for the more rural Glaze area.

Additionally, short term or "one off" flow measurement is carried out to provide information for specific projects, usually for setting water quality standards.

Local Hydrometric Network

River Level Monitoring

In the Sankey area there are two level monitoring stations, both in the Warrington area.

- At Causey Bridge, 4 km's north of Warrington, the station records levels over a nonstandard weir, for flood warning and water quality.
- At Sankey Bridges close to the 'Sloop' public house, 2 kilometres west of Warrington, river levels are recorded. Data is required for flood analysis and water quality management.

In the Glaze area there are two level monitoring stations.

- At Lilford Park, 1.5 kms north of Leigh, the station records levels in an open channel, of Lilford Brook, mainly for flood defence operations and flood warning management.
- At Little Woolden Hall on the Glaze 3 kilometres south east of Culcheth, levels and flows are measured by portable ultrasonic equipment. The data is used for water quality management.

**Sankey/Glaze
Local Management Plan
Map 12**



ENVIRONMENT AGENCY



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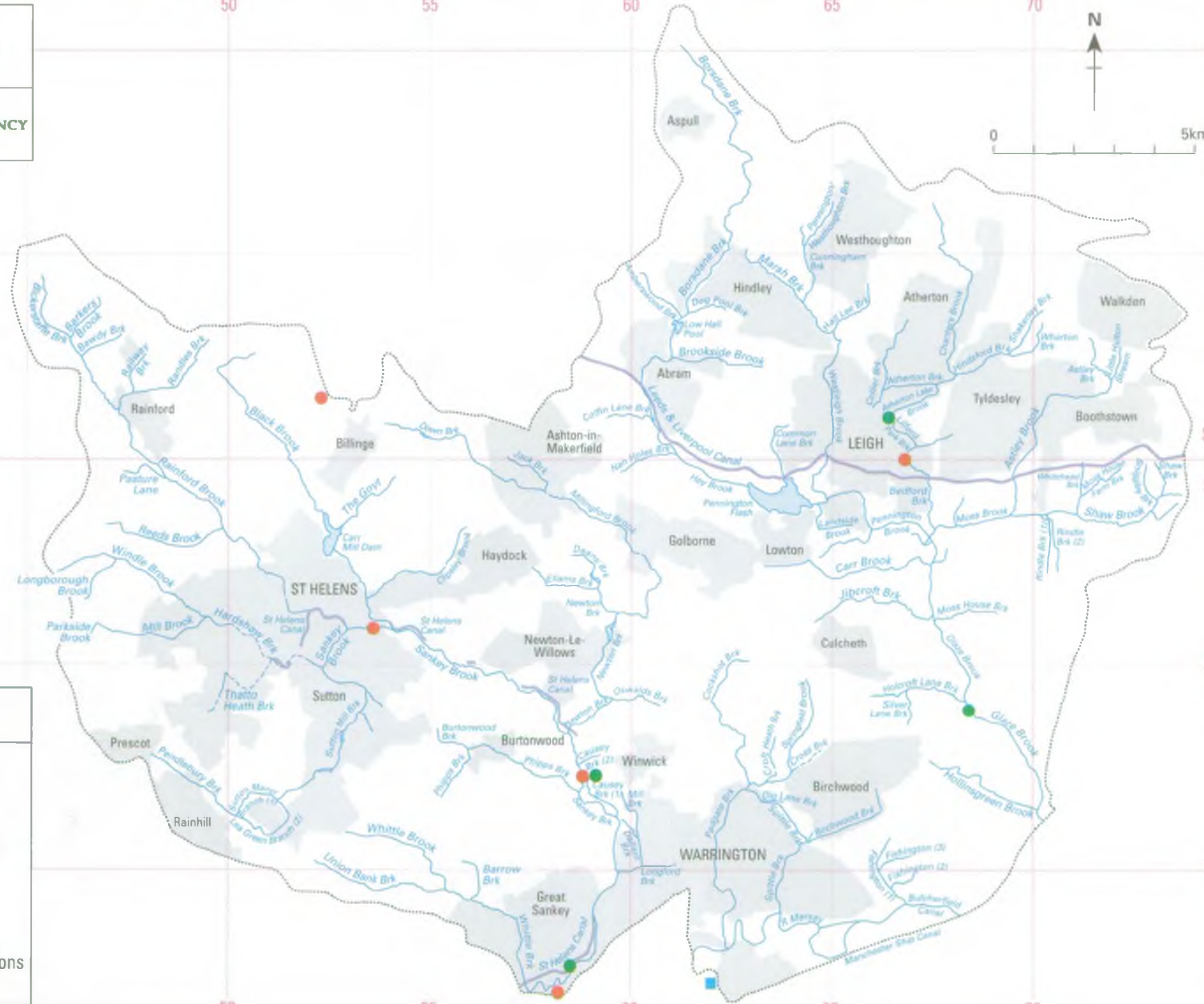
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Hydrometric Network

KEY

- Catchment Boundary
- Watercourse
- Culverted Watercourse
- Canal
- Built up Area
- Rain Gauge Locations
- River Monitoring Locations
- Weather Station



4.1.3 Water resources

Rainfall Monitoring (Map 12)

There are five raingauge sites within the area, monitored by the Environment Agency, located at:-

- Bedford Pumping Station, Leigh,
- Parr Wastewater Treatment Works,
- Gatewath on the lower Sankey,
- Billinge north of St Helens,
- Causey Bridge north of Warrington.

Future Proposals

It is proposed to connect the Gatewath raingauge in the lower Sankey area to the Regional Communications System. There will continue to be a need for ad hoc measurements for specific projects which will be carried out as required.

4.1.4 Area Drainage

Flood Warning Zones

In the Sankey area there are no flood warning zones operational at present. However, a warning zone covering the Gemini, Dallam and Sankey districts of Warrington is in preparation and this will become operational in the near future. Warnings for tidal flooding operate in the Warrington area.

In the Glaze area a flood warning zone for Bedford Pumping Station and Lilford Park (Zone GM4) is to be implemented in spring 1996. Initially flood warnings will be passed to Greater Manchester Police, who will then pass on warnings to the Local Authority and properties in the Green Lane, Higher Fold and Lilford Park district of Leigh. From Autumn 1996 warnings will be given directly by the Environment Agency. It is intended that flood warning zones will be considered for the Jennets Lane and Pennington Pumping Stations in the near future.

Historic Flood Events

There are 18 locations at key points in the area, known as flood pins, where levels are taken following high river levels. Information regarding historical flooding is better documented in the Glaze area than in Sankey area. The highest recorded water levels available were in August 1973 and March 1981.

OPERATIONAL MAINTENANCE

The responsibility for river maintenance and the structural integrity of embankments of any watercourse, principally rests with the riparian landowner, whose ownership, as a general rule, extends to the centre line of any such river. The Environment Agency has discretionary powers to carry out works and maintenance within and around watercourses designated as "Main River" on the Main River Maps (See Map 13).

Pumping Stations

In the area there are four land drainage pumping stations maintained by the Agency to drain areas affected by mining subsidence at:-

- Bedford Pumping Station
- Jennets Lane Pumping Station
- Pennington Pumping Station
- Pendlebury Pumping Station

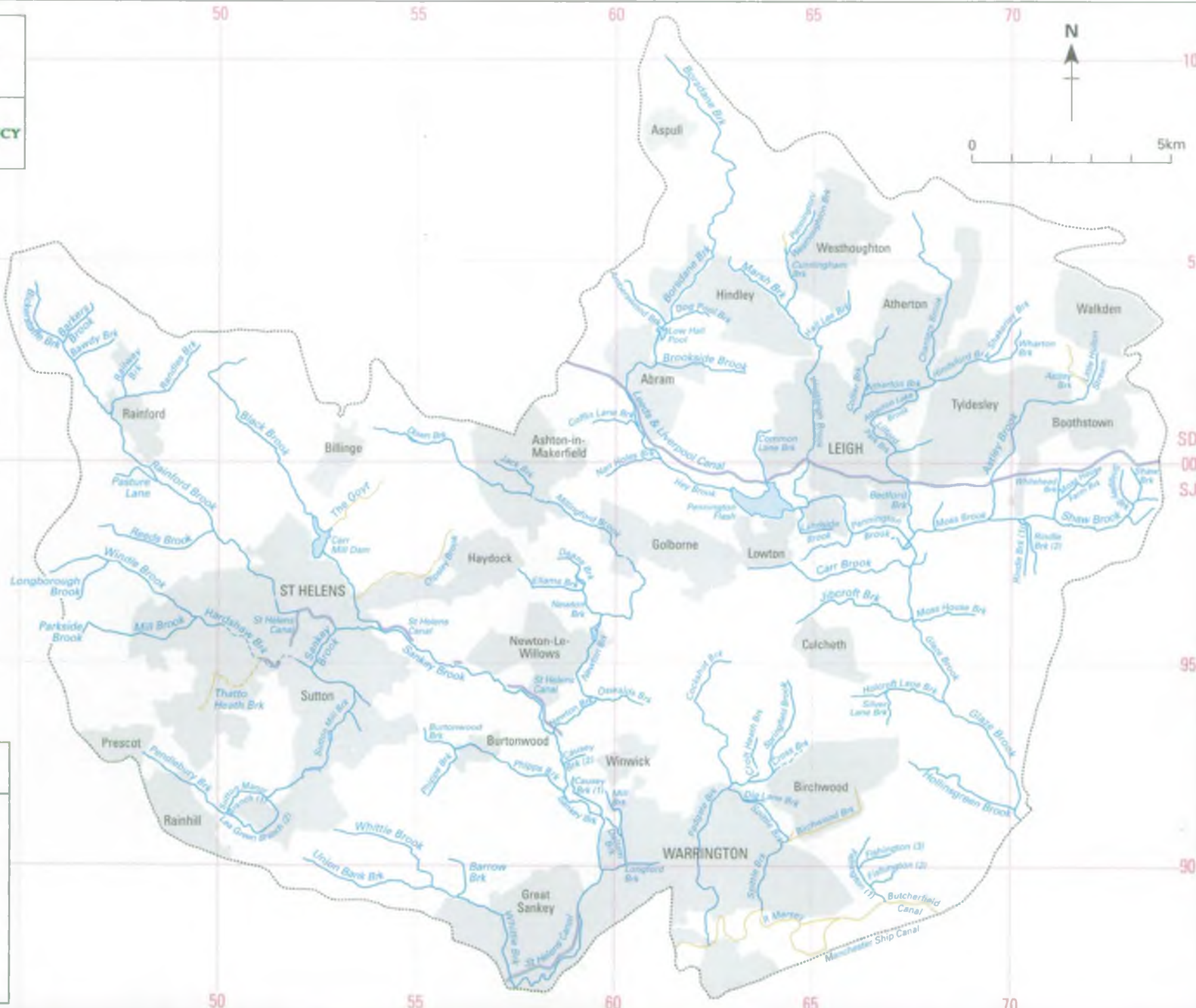
Sankey/Glaze
Local Management Plan
Map 13



ENVIRONMENT AGENCY



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Main Rivers

KEY

- Catchment Boundary
- Main River
- Ordinary Watercourse
- Culverted Watercourse
- Canal
- Built up Area

**Sankey/Glaze
Local Management Plan
Map 14**



ENVIRONMENT AGENCY



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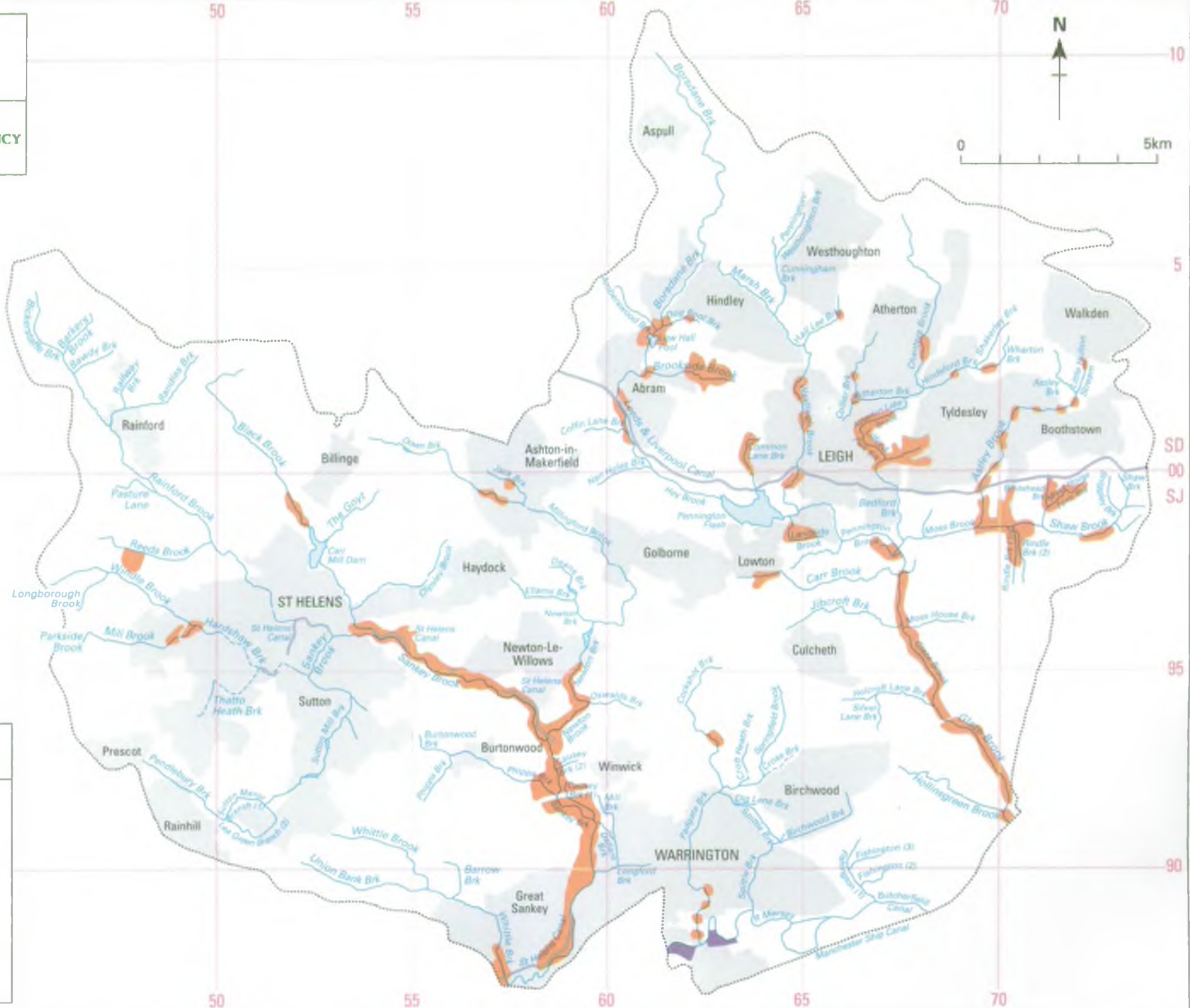
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Flood Risk Areas

KEY

- Catchment Boundary
- Watercourse
- Culverted Watercourse
- Canal
- Built up Area
- Areas at Risk
- Tidal Flood Risk Area



4.1.4 Area Drainage

Debris Screens

There are 23 debris screens in the area, which are cleared by the Agency on a best endeavours basis, as resources allow. Additionally, automatic weed screen cleaners have recently been installed to the inlet screens at Lilford Park Control Sluices and Bedford Pumping Station. Inlet screens at the other pumping stations are cleared manually.

Urban Channel Access

A number of locations suitable for the construction of access ramps have been identified across the area. As part of the Urban Channel Access scheme, three access ramps have been proposed on Bedford Brook, at Widow's Street, Leigh Spinners and Hooten Lane Nursery, Leigh.

Flood Storage Reservoirs

Within the Glaze area flood protection upstream of Bedford Pumping Station is provided by the flood storage reservoir at Lilford Park, which is operated by the Agency. At Common Lane, Leigh a flood storage reservoir was constructed in 1970 by Wigan Metro and British Coal to protect property in Plank Lane and Common Lane. This basin is operated by Wigan Metro and the Coal Authority.

Culverts

There are over 138 culverts, totalling 10.4 km, within the area. A number of these, which are prone to blockage or flooding, have been inspected by the Agency. Mainly, problems are encountered with culverts in urban areas, but undersized and poorly maintained culverts through agricultural land may cause flooding also. Where possible owners of culverts are encouraged to open them out into open channels.

MAINTENANCE PROBLEMS

Site specific flooding and maintenance problems have also been identified at various locations in the area. Problems encountered include :

- effects of sewer and pipe crossings at low levels;
- localised flooding of agricultural land due to farm access or agricultural culverts that are undersized or in poor condition;
- corroded Armco type metal culverts;
- potential reduction of levels of flood defence from severe but localised erosion of flood banks;
- localised damage to sections of concrete bed and bank protection works.

4.1.4 Area Drainage

Illegal tipping of rubbish and litter into watercourses and on the banks

Rubbish problems effecting Main Rivers across the area are being tackled, when reported or requested, by the Agency's Enforcement Officer. The Agency sponsored Water Watch and Stream Care projects, look after litter problems on other rivers and canals. Water Watch encourages Local Authorities, waterside businesses, schools, voluntary groups and local communities to get involved in clearing rubbish from rivers and canals and preventing the problem recurring.

The Water Watch Project has worked on Millingford Brook, raising awareness of the rubbish problem in the media and local schools, and by contacting waterside businesses about their waste management. Advice has been given to Rangers from the Metropolitan Borough of St Helens on litter problems on Black Brook. The next waterside litter problem to be tackled will be on Sankey Brook in the Parr area of St Helens.

Stream Care supports local voluntary groups to clean up and improve the river environment, giving practical help and advice. The Project has already helped numerous groups in the area for instance, on Sutton, Mill, Whittle, Penn Leach, Collier and Chanters Brook.

CAPITAL SCHEMES

A review of Capital Schemes in the Long Term Plan is underway to ascertain whether further investigations should take place. Schemes identified to deal with perceived flooding problems in the area so far include, Jack Brook in Ashton in Makerfield, Common Lane Brook in Leigh, Shakerley Brook in Tyldesley, Landside Brook in Hindley which have problems caused by culverts and Borsdane Brook in Hindley where there is a section of low bank. If schemes are cost beneficial, capital works are programmed in the North West Region Long Term Plan for completion after 2006.

Capital Schemes in the Long Term Plan

Sankey Brook Improvement Scheme

A key finding of the Sankey Brook Catchment Study was that the level of service against flooding in the Dallam area and downstream of Sankey Bridges, in Warrington, was below the indicative standard. Following the appointment of consultants to carry out a feasibility study of the flooding problems, a consultation document promoting improvement works was produced in January 1994. Design work for the proposed improvement scheme is due to start in the near future with construction expected to begin after the year 2000.

**Sankey/Glaze
Local Management Plan
Map 15**



ENVIRONMENT AGENCY



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**Flood Defence: State of
The Catchment**

KEY

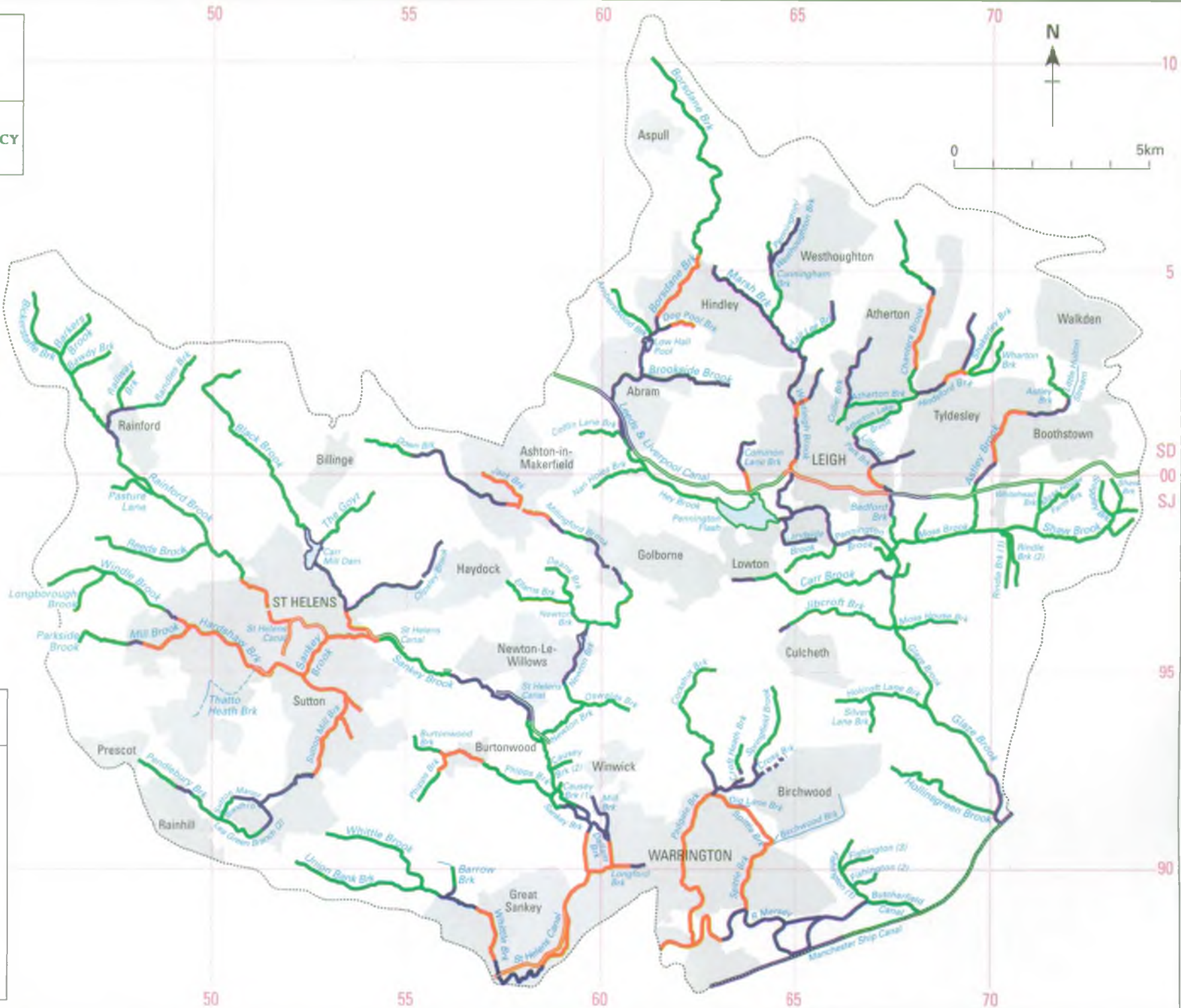
- Catchment Boundary
- Watercourse
- Culverted Watercourse
- Canal
- Built up Area
- Proposed Access Ramps
- Riparian Owned Screens
- Agency Owned Screens
- Weir/Control Structure
- Normal Tidal Limit
- Pumping Station

**Sankey/Glaze
Local Management Plan**

Map 16



ENVIRONMENT AGENCY



**Flood Defence: River
Corridor Land Use Plan**

KEY

- Catchment Boundary
- Watercourse
- Culverted Watercourse
- Canal
- Built up Area
- Urban
- Semi Urban
- Rural

4.1.4 Area Drainage

Padgate Brook River Rehabilitation Scheme

A River Rehabilitation scheme is proposed on Padgate Brook, upstream of its confluence with the River Mersey. The proposed works will introduce meanders, low level berms and landscaping, to naturalise the existing artificially formed trapezoidal section, with the overall objective of improving the river corridor for recreation and conservation purposes.

Astley Brook Improvement Scheme

A feasibility study to investigate flooding problems and possible flood defence works on Astley Brook has been undertaken, the final report for this is due shortly. Channel improvements to raise the level of protection are likely to be proposed and capital works are programmed for the end of the North West Region Long Term Plan period.

Development Control

There are a number of development proposals at various stages within the area including:-

Padgate / Spittle Brook area

Major Developments ~ The construction of a Motorway Service Area at M6 Jct 22 with a discharge into Cockshot Brook is proposed.

Major Highways ~ The proposed M6 widening scheme will affect Spittle Brook.

Whittle Brook area

Major Developments ~ Further development of Burtonwood Airfield is proposed.

Major Highways ~ There are no major highway developments proposed.

Sankey Brook area

Major Developments proposed include~

- Stone Cross Lane, Golborne draining to Millingford Brook.
- Parkside Colliery Re-development, draining to Newton Brook.
- M6 Motorway Service Area Jct 22, draining to Newton Brook.
- St Helens Gateway sites, draining to Pendlebury Brook.
- Housing Development upstream of Rainhill Road, draining to Pendlebury Brook.
- Rail Hub Development at Hawleys Lane, Warrington, draining to Dallam Brook.
- Gemini Sites draining to Sankey Brook.
- St Helens Canal Restoration Project affecting Sankey Brook.

Major Highways ~ M62 Jct 9 construction, discharging into Sankey Brook.

Glaze area

Major Developments ~ There are no major developments planned in the area.

4.1.4 Area Drainage

Major Highways ~ The proposed M6/M61 Linkroad will affect the Amberswood, Borsdane and Pennington West Houghton Brooks.

Development Policy

Storage of Surface Water Run-off

Storage of run-off, in order to provide high flow attenuation, is requested for all developments which drain into Hardshaw Brook in St Helens in the Sankey area and Astley, Brookside and Hall Lee Brooks in the Glaze area. Elsewhere each development will be considered on its own merits.

Ordinary Watercourses (Non "Main River")

A flooding and capacity problem has been identified with Cinnamon Brook, a non-main tributary of Spittle Brook. The local authority carries out maintenance to this watercourse at present

Environmental Objectives

The Environment Agency looks to protect and enhance the environment, which in carrying out its Flood defence powers often means a balance has to be struck between the need to protect people and property from flooding and the environmental impacts of works in and adjacent to watercourses. This balance is agreed with both internal conservation experts, all major local and national environmental organisations and with the public of the area, in open consultation, prior to commencement.

4.1.5 Waste Disposal

General

The majority of the waste generated within the UK is disposed of via landfill sites. The wastes that pose the most threat to the water environment are those that degrade or leach, to produce water soluble products. All surface and groundwaters can be placed at risk from landfills but groundwater tends to be the most vulnerable, due largely to the practice of infilling voids created by mineral extraction below ground level.

The Agency is a statutory consultee of the Planning Authorities under the Town and Country Planning Acts. At this stage the Agency considers the suitability of the proposed location of waste disposal sites on a site specific basis, to ensure that the development would not pose an unacceptable risk either to ground or to surface waters. Planning permission is required before a Waste Management Licence can be issued. A Waste Management Licence is required from the Agency for the storage, treatment or disposal of controlled waste on land.

The disposal of waste onto land is regulated under Part II of the Environmental Protection Act 1990. The relevant provisions for licensing of waste activities were implemented on 1 May 1994. Before this date, licensing of waste operations was required under Part I of the Control of Pollution Act, 1974. Prior to this, controls over waste activities were indirect and included the planning and Public Health powers exercised by the local authorities.

A Waste Management Licence sets out the requirements for the detailed operation of the site and includes measures to be taken by the operator to safeguard and protect the environment. For a non-inert landfill such measures may include an engineered liner to contain any leachates which may be produced within a landfill, and measures for collecting and disposing of these leachates. Licence holders are generally required to monitor groundwaters, surface waters and leachate to ensure that landfill sites are operating to the expected standards.

It should be noted that many waste management operations other than landfill also require a Waste Management Licence. These activities include transfer stations, incinerators, metal recycling facilities, and waste storage and treatment facilities. For such sites licences may require impermeable surfacing, bunding of tanks and appropriate disposal of contaminated surface water run-off.

For currently licensed sites, the Environment Agency can continue to require the environmental management and monitoring of the site until it considers the site is no longer likely to cause any pollution of the environment, at which time it will accept surrender of the licence.

4.1.5 Waste Disposal

Local Perspective

There are a number of currently licensed waste management operations within this area. The number of sites identified for each activity is listed below:

Transfer Station	21
Waste Storage	1
Non Inert Landfill	8
Inert Landfill	3
Scrapyards & Car Breakers	7
Civic Amenity	7
Treatment Plant	1

One landfill site in the Sankey area has a consent to discharge to Black Brook. Contaminated surface waters are required to be treated to meet a high standard for discharge, and the performance of this treatment has been very satisfactory.

The Agency is very aware that the Sankey area in particular suffers from pollution caused by tipping, which dates back to a period when waste disposal was not subject to the present controls and standards. The Agency will continue to carry out its role so as to ensure that such past practises are not repeated.

Environmental Objectives

- to ensure waste management activities do not compromise water quality or water resources and that they are undertaken in accordance with advice given in the Agency's Policy and Practice for the Protection of Groundwater document.

Environmental Requirements

Water Quality:

- To ensure compliance with EU Directives on dangerous substances discharged to surface and groundwaters.
- The implementation of the Environment Agency's Groundwater Protection Policy.
- The prevention of pollution of controlled waters.

Water Quantity:

- No reduction in the availability of water resources.

4.1.5 Waste Disposal

- Minimise the loss of recharge zones.

Physical Features:

- Improve all sites to an acceptable environmental standard, taking into account the opportunities for conservation, recreation and amenity.
- Safeguard features of the water environment which are of ecological or landscape value.
- Ensure that any necessary flood defence works should be carried out in an environmentally sensitive manner.
- Maintain the integrity of the river channel adjacent to the landfill sites.

4.1.6 Contaminated Land

General

In most areas of historical industrial development, sites of contaminated land are found. The Sankey/Glaze area has particularly suffered in this respect due to its significant role in the Industrial Revolution. Due to the expansion of industry within the towns and cities, many rural areas were also utilised, at that time, for the disposal of waste products.

Significant areas of land have been contaminated as a result of:

Chemical Works

Tanneries

Gas Works

Oil Processing

Engineering Works

Metal Refining Works

Military establishments

Mining/Mines

Closed Landfill Sites

Textile Industry

Historically, poor site management, housekeeping, operation and uncontrolled waste disposal frequently resulted in land becoming contaminated. In recent times, awareness of potential environmental impact of activities has improved this situation.

Redevelopment of land provides an opportunity to remediate contaminated sites and enhance the water environment. The Agency works closely with Local Authorities, developers and other parties and will advise developers on the vulnerability and sensitivity of the site in relation to groundwaters and surface waters. The implications of the contamination present will be considered and any required remediation highlighted. However, whilst some sites can be addressed this way, this has not proved enough to make more than small inroads into this widespread issue.

Where a site is known to be causing an impact on controlled waters, the Agency will seek improvement measures from the landowners, occupiers or other liable parties in order to alleviate the situation.

Local Perspective- mining industry

The Sankey/Glaze area is extensively underlain by Carboniferous Coal Measures and as a consequence coal mining has been a dominant feature of this area.

4.1.6 Contaminated Land

In general there are three sources of mine drainage which may impact on water quality:

- 1) Water pumped from active mines. These discharges are usually subject to some form of treatment and controlled by the consent of the Agency.
- 2) Water emerging from former underground workings that have flooded when dewatering for the purpose of working has ceased. Such water may discharge underground to other groundwater systems, or at the surface to watercourses.
- 3) Water that has percolated through mine spoil heaps or other associated wastes.

Historically, problems arising from abandoned mines have been exempt from legislation as there has been a statutory defence where water is permitted to flow from an abandoned mine. The Environment Act is to introduce measures to enhance the Environment Agency's ability to deal with pollution from abandoned mines. These include the removal of statutory protection for mines abandoned after the end of 1999. There is also a new requirement for mine operators to give a minimum of six months notice of their intention to abandon a mine to allow steps to be taken to prevent or mitigate minewater pollution .

Wastes arising from mines and quarries are not Controlled Wastes and are therefore not subject to the pollution controls relating to waste, such as, Waste Management licensing.

There are no longer any active deep mines in the Sankey/Glaze area, however some open cast mining is carried out and discharges from this are regulated by the Agency. One closed deep mine in the Sankey area is considered to be causing an ochrous discharge to Clipsley Brook. The Agency is continuing to take an active role in investigating future environmental impact of recent colliery closures, and will monitor and press for improvements where appropriate.

Many spoil heaps occur in the area, although a large proportion of these have previously been capped or restored to reduce the amount of water that percolates through them, resulting in pollution. A number of existing spoil heaps continue to cause problems which the Agency would seek to be addressed, upon redevelopment of the areas. The largest of these sites is in the Glaze area at Cutacre Tip, Little Hulton, where surface water run-off causes ochreous discharges to the Hindsford Brook system.

Local Perspective

In addition to problems associated with the mining industry, this area, particularly the Sankey area, also has a significant legacy of land contaminated by industry. Some of the most important of these sites, concentrated in the Sankey area, include glass manufacture, the alkali industry, copper smelting, town gas works and chemical manufacture. The area also has a number of closed landfill sites which have fallen out of the waste licensing regime. This is because prior to 1 May 1994 licences could be surrendered on cessation of tipping.

4.1.6 Contaminated Land

Early industry in the St Helens area dates back to the 18th and 19th centuries. Some of these industries produced relatively large volumes of wastes. Historically these wastes were deposited without awareness or regard to pollution, and the consequences are still evident.

Contaminated land is the greatest single cause of degraded water quality in the Sankey area. Contaminated land within this area affects not only surface waters, but also groundwaters at some sites.

In addition to the impact of gross pollution on the watercourses of this area, contaminated land also hinders the Agency in its efforts to promote and improve the conservation and ecological value of this area and in the carrying out of maintenance and flood defence work.

Because surface water quality in the Sankey area will remain unacceptable until contaminated land is addressed, the Agency is taking an active role in tackling these issues.

The NRA participated in the setting up of the Sankey River Valley Initiative. This initiative is a partnership scheme which includes the local community, local authorities, industry, landowners, etc and has been set up under the umbrella of the Mersey Basin Campaign. The Agency will maintain involvement in these initiatives.

The Agency seeks, through approaches and advice to landowners, to have remedial action taken to prevent pollution. One success has been the diversion of the discharge from a closed landfill site to the foul sewer for treatment. The Agency has identified a number of contaminated sites in the Sankey area which are having a direct impact on water quality, and will continue to work in partnership with other bodies and endeavour to have these sites addressed.

Although the Agency is not responsible for the remediation of contaminated land, in some instances the problems have been so acute that special provision has been made by the Agency to carry out works. Four sites in the Sankey area have been investigated under Agency instructions, and remedial works, which include the capping of a water abstraction well and the installation of a cut-off drain to collect contaminated leachates, has been carried out on one of these sites, in conjunction with the Local Authority. Further action is required to bring these critical sites up to an acceptable standard.

Full remedial works at these sites are likely to cost very substantial sums of money. Progress is likely to depend on government policy, and in particular on availability of funding. Often the feasibility of remediation is influenced by the added value conferred on land by remediation and redevelopment. Where a site is not suitable for a high value after use, the economics become more difficult to justify.

The Environment Agency encourages consultation over site reclamation and redevelopment at an early stage, and will advise and assist where possible.

4.1.6 Contaminated Land

Environmental Objectives:

- Reduce the risk of land becoming contaminated from current and future activities.
- Advise and promote on redevelopment of sites to ensure a reduction in risk of pollution of controlled waters and no detrimental impact.
- Continue to participate in the Sankey River Valley Initiative, which promotes the reclamation of contaminated land.
- Continue to work in partnership with other bodies and be pro-active in seeking to promote action to deal with sites where a significant impact on water quality has been identified.
- To pursue remedial action taken to deal with pollution arising from four contaminated land sites which have been identified as critical.

Environmental Requirements:

Water Quality:

- To ensure compliance with EU Directives on dangerous substances discharged to surface and groundwaters.
- The implementation of the Environment Agency's Groundwater Protection Policy.
- The prevention of pollution of controlled waters.

Water Quantity:

- No reduction in the availability of water resources.
- Minimise the loss of recharge zones.

Physical Features:

- The reclamation of all sites to an acceptable environmental standard, taking into account the opportunities for conservation, recreation and amenity.

4.1.7 Fisheries

General.

This use covers both game and coarse fisheries, that is, the development and maintenance of breeding populations of all freshwater fish species.

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

Local Perspective.

The Agency undertakes periodic fish population surveys on all rivers. The results of these surveys for the area, together with an indication of the species that might be expected, are shown on map number 17.

The habitat available to fish within the Sankey Brook area, is generally poor with narrow silty channels with low gradients and little flow. There are however, some areas in the upper reaches that would be suitable for Brown Trout if the water was of suitable quality.

Fish populations are severely restricted and confined to small areas downstream of lakes, including Carr Mill Dam, which is a well established stillwater fishery. Poor water quality combined with low flows and siltation have restricted the fish present to sticklebacks, in most of the areas watercourses. However, there are large numbers of eel and flounder in Whittle Brook.

The Glaze area should, by its physical nature, maintain good mixed fisheries, including brown trout in its upper reaches. However, due to the poor water quality throughout the area no fishery exists within the river system. There is, however, one exception, a small fishery exists downstream of Pennington Flash, but extends only the short distance downstream to the confluence with Westleigh Brook.

The length of the river Mersey, from Bollin Point to Howley Weir, has two distinct sections as far as fisheries are concerned. The length from Bollin Point to Woolston Weir has a poor water quality and supports low numbers of coarse fish. From Woolston weir to Howley Weir the water quality is improved and there is a good coarse fish population. The new weir at Woolston was constructed by the Manchester Ship Canal Company with the inclusion of a coarse fish pass (with advice from the NRA). This pass has a problem with debris collecting in it and it is hoped that it will be fitted with a deflector in the future. It may also be possible to fit a sluice system to the pass which would make it possible to use it as a fish trap to monitor fish migrating up stream.

**Sankey/Glaze
Local Management Plan
Map 17**



ENVIRONMENT AGENCY



0 5km

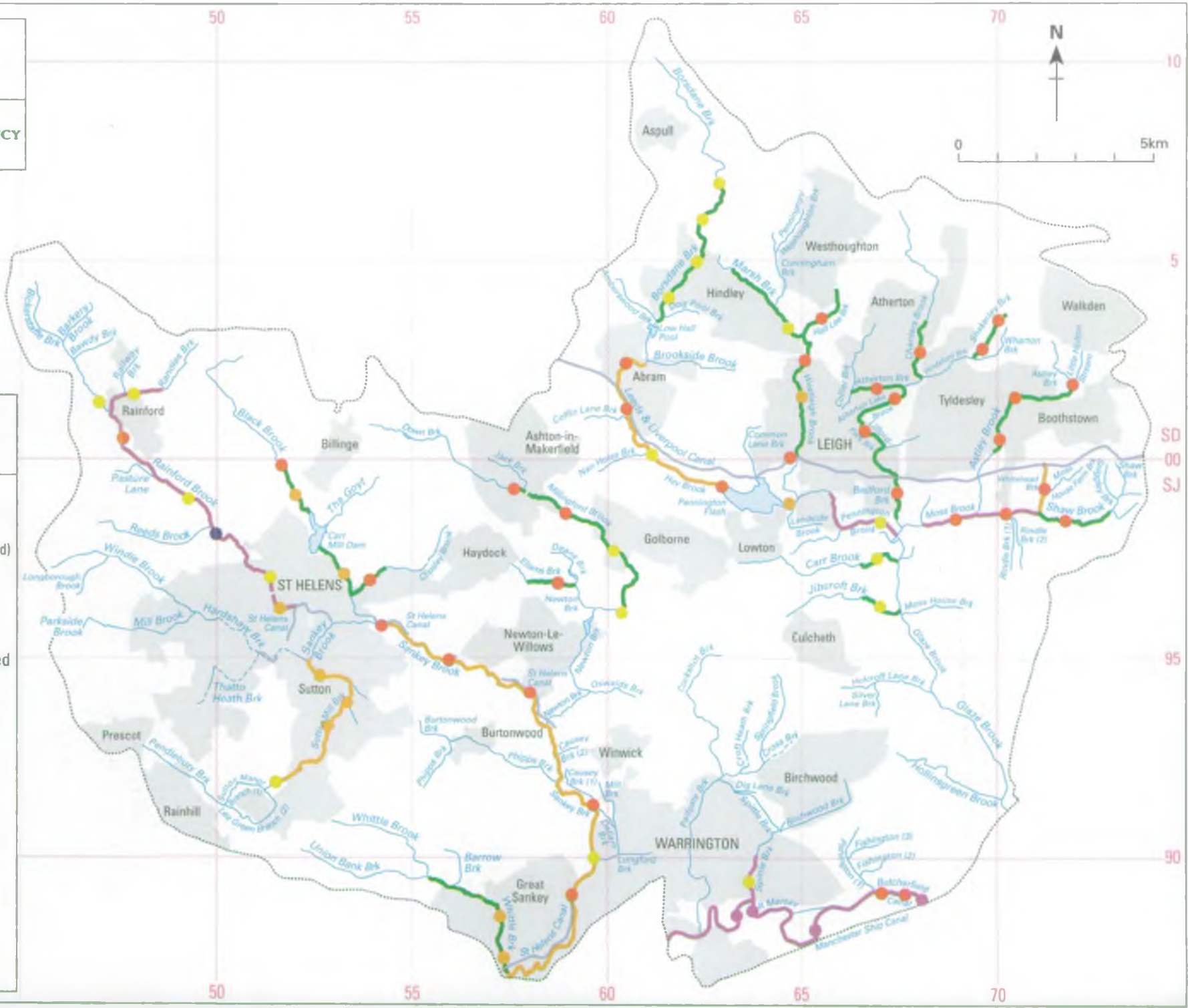
**Fisheries: River Habitat
Potential and Actual
Fish Species Recorded**

KEY

- Catchment Boundary
- Watercourse (Not Surveyed)
- - - Culverted Watercourse
- Canal
- Built up Area

Potential Recorded

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



4.1.7 Fisheries

Pennington Flash is a large stillwater in the Glaze area which is fed by Hey Brook and drained by Pennington Brook. The flash has historically been a good quality coarse fishery. However, in recent years the fishery has reportedly declined and its value as an angling water has fallen. The Agency will continue work, that was started by the NRA, to ascertain why the fish population seems to be in decline.

Environmental Objectives.

The overall objective is to develop conditions that will support and sustain a natural fish population appropriate to the area.

Environmental Requirements.

Water Quality:

- River stretches suitable for brown trout are to be maintained within the limits for pollutants as specified in the EC Fisheries Directive (78/659/EC) for salmonid fish, or by non-statutory RQOs and future SWQOs whichever is appropriate.
- The remaining designated river stretches are to be maintained within the limits of pollutants as specified in the same EC Directive, but for coarse fish species, or by non-statutory RQOs and future SWQOs whichever is appropriate.

Water Quantity:

- A flow pattern is required where the monthly average reflects the established or natural flow conditions in the river.

Physical features:

- A diversity of natural river features are required, for example, riffle and pool sequences and weed beds for feeding and spawning. It is necessary to ensure that a suitable variety of habitats are provided, to allow the maximum production and long term security of the resident fish populations.
- The presence of bankside vegetation is required to provide adequate shade, cover and refuge.
- River maintenance operations must have a minimal impact on fish populations and enhance river habitat diversity where practical.
- Access by fish to all sections of river is necessary to sustain a viable population. The passage over or through obstructions is required.

4.1.8 Conservation

General

The Environment Agency has a duty to promote and enhance the conservation of the water environment in all its activities, and those of third parties. It does this by assessing, minimizing and mitigating the ecological impacts of its own maintenance and capital schemes and influencing local authorities, developers, landowners, and other bodies through the planning and regulatory system and general liaison. We will seek to protect all designated sites, the wider countryside and all habitats of local importance associated with watercourses, ponds and wetlands.

Local Perspective

There are eight Sites of Special Scientific Interest (SSSIs) in the area, five of which are mosslands. There are 106 sites have been designated, by the local authorities, for their nature conservation value, 73 of which are water related. These are known as Sites of Biological Importance (SBIs) in Greater Manchester, Sites of Community Wildlife Interest in St Helens and Sites of Biological Importance in Merseyside (SBIs). They represent the best known examples of river corridor habitats in the area and include: marshy habitats within floodplains, such as Oswalds Brook, unimproved grassland, such as, Stanley Bank Meadow SSSI and woodland such as along Borsdane Brook.

The significant peat deposits in the area have been exploited over many years such that only fragments of original mossland remain, for example: Holcroft Moss SSSI, Risley Moss SSSI, Astley and Bedford Moss SSSI and Chat Moss SBI. Peat extraction for the horticultural market still continues on Astley, Bedford and Chat Mosses, despite the nationally high conservation value of this habitat. The productive peaty farmland that surrounds these mossland areas is at a lower level and nearly all of them suffer from drying out and tree colonisation. Some of them, such as Chat Moss and Risley Moss are being managed to retain and enhance their existing value to their specialist species of plants, dragonflies and birds. There are a couple of experimental initiatives in the area to restore conservation interest to abandoned farmland.

Another notable feature of the area is the number of large water bodies, the Dams and the Flashes. These provide an invaluable habitat for wildfowl and other aquatic species. Carr Mill Dam is designated a Community Wildlife Site, Pennington Flash is an SBI and Abram Flashes is an SSSI. Other wetlands of note include, the Thelwall Eyes and Rixton Clay Pits. The value of, and interest in, these areas is reflected in the activities of, for example, the Newton Lake Action Group, The Wigan Flashes User Group and the Hey Brook Corridor Working Party. The Agency has some involvement with all of the above.

The NRA has undertaken a general river corridor survey for most of the Sankey area. Similar surveys have been carried out approximately 50% of the Glaze area, mainly in response to flood defence works. As a result of this we know that many watercourses have been degraded. This has been confirmed by doing a preliminary survey of a sample of sites, using the new River Habitat

**Sankey/Glaze
Local Management Plan**
Map 18



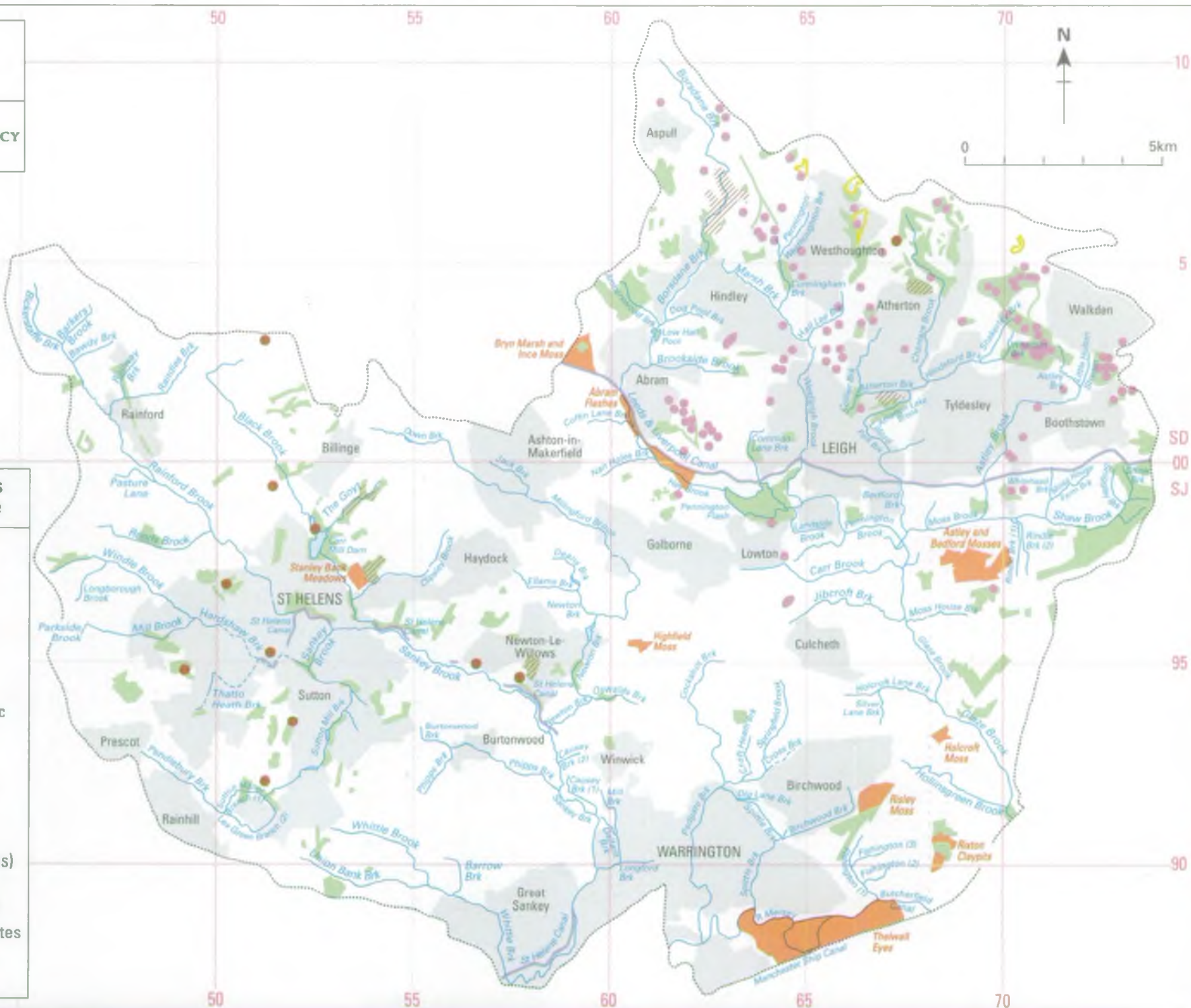
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**Designated Sites and Areas
of Conservation Importance**

KEY

- Catchment Boundary
- Watercourse
- Culverted Watercourse
- Canal
- Built up Area
- Sites of Special Scientific Interest
- Ancient Woodlands
- Known Great Crested Newt sites
- Sites of Biological Importance/Interest (SBIs) and Sites of Community Wildlife Interest (SCWIs)
- Bolton Wildlife Project sites
- Regionally Important Geological Sites (RIGS)



4.1.8 Conservation

Survey methodology (RHS). RHS has given us an initial idea of how the existing conservation resource compares with what could be expected within the natural physical restraints, and where river improvement works might be most beneficial.

Over 50% of the watercourses in the area are low altitude, low gradient rivers or streams on soft geology. These include the Sankey and the Glaze themselves. Because, this type of a land is easy to develop and cultivate many of these watercourses have been straightened, widened, deepened or embanked. Therefore, many of the habitats that could occur, for example, gravel beds, earth cliffs, overhanging banks and meanders, have been lost, and replaced with uniform, steep banked water carriers. Moreover there is less energy in these watercourses, particularly the smaller streams, which would allow them to recover from such intensive management of their own accord. It is, therefore, particularly important to retain unmodified stretches where they occur, for example on Millingford Brook through Golborne. However, development pressure continues to have a major adverse impact on the area.

Most of the rest of the watercourses are also low altitude, low-gradient, rivers, but, on mixed geology. Gravel beds with larger cobbles could be expected as could other features of conservation value such as riffles and pools. However, they have also been modified, particularly in the Glaze area where they coincide almost exactly with the urban areas of Hindley, Tyldesley, Atherton and Leigh. Notable exceptions are Borsdane and Hall Lee Brooks which are still natural and meandering. Where Rainford, Black, Clipsley and Hardshaw Brooks and their tributaries pass through St Helens, they have also been typically constrained by urban development to the bank top, culverts, tipping, hard revetment, concrete, brick and stone walls and sheet steel piling. However, upstream these watercourses retain many natural features and are of high local conservation value.

Only a very small proportion, approximately 10 km, of the watercourses in the area have a comparatively steep gradient. These are a few of the smaller tributaries such as Down Brook, Railway Brook, stretches of Hall Lee Brook, Borsdane Brook and Pennington brook. They have sections of high conservation value with little sign of modification and contain the riffles, pools, point bars and stony substrates valuable to wildlife. Due to their steeper gradient they are better able to recover to a natural condition over time. Exposures of bedrock occur in all the river types. Where they are found they enhance the value of the watercourse.

There is reasonable tree cover along some watercourses. There are semi-continuous or scattered bankside trees along significant stretches of, for example, Black Brook, Chanters Brook, and Atherton Lake Brook. Trees are an invaluable habitat. Their, foliage, branches and roots provide shade, cover and food. Moreover when a watercourse passes through one of the small blocks of woodland which characterize parts of the area the banks and channel are often undisturbed. Five of the woodlands designated as SBIs or CW sites are known to be ancient woodlands. However a significant proportion of the watercourses have poor tree cover and there is a need for it to be re-instated.

4.1.8 Conservation

The grassy banks along many of the watercourses are dominated by common or rank grasses and species tolerant of high nutrient levels, such as nettles, are abundant. A more diverse or undisturbed flora is only found in a few locations. The bankside flora of Sutton Brook at Worsley Brow is considered to be of particular interest. Here, remnants of an alkali waste tip support specialized plant species. Sites such as these are vulnerable to insensitive reclamation works.

The conditions created by the altitude, geology and gradient of the area would be expected to provide habitats suitable for extensive aquatic plant growth, reed fringed, slow flowing, meandering and gravel dominated watercourses. Remnant patches of common reed occur frequently in the area and there is a reasonable abundance of common emergent plants. However, more pollution tolerant species such as Branched Bur Reed dominate long lengths. More diverse stretches with species such as Valerian and Marsh Marigold are less common but occur for example on Windle Brook. Particularly polluted or heavily maintained lengths are effectively devoid of aquatic life.

There is a lack of specific information on most animal groups using the area. An exception is the great crested newt which is known to occur in significant numbers in the Wigan area. The North West is the European stronghold of this internationally threatened amphibian species. It is the rarest newt in Britain and is declining faster than any other amphibian species so is protected under the Wildlife and Countryside Act 1981.

Many species of plant and animal have declined nationally in numbers and distribution. Many are endangered, some to the extent that they are legally protected under the Wildlife and Countryside act 1981. A number of them occur in this area and may even be well represented.

The water vole has been undergoing a national decline possibly as a result of pollution, habitat loss and predation by mink. They have been recorded on Whittle brook. They are largely associated with slow-flowing rivers which are vegetated to the waters edge. To improve the value of the catchment for this riverine species we need to know where its main strongholds are and the quality of potential habitats, in the area.

In contrast to the Glaze area there has been no co-ordinated survey of ponds and wetlands in the Sankey area. We therefore have incomplete data on newt, frog and toad populations which are all known to be declining nationally. There has been steady and severe loss of ponds in the area so amphibian populations have almost certainly declined locally. We therefore need to know which ponds are key habitats.

Of the 15 species of bat found in Britain, five are particularly associated with watercourses. Bat populations generally are declining and all species and their roosts are protected. Bridges, culverts, and mature trees with holes or cracks in them can all be suitable roost sites and all are vulnerable to disturbance.

4.1.8 Conservation

Invasive weeds such as Japanese knotweed and Himalayan Balsam occur frequently throughout the area. Giant Hogweed has also been confirmed in the area.

There are many non-Agency initiatives in this area with implications for nature conservation such as the Sankey Valley Initiative, the Community Forests, St Helens, Warrington and Wigan Policies For Nature, the St Helens Recreation Strategy and the Mosslands Strategy written by Wigan and Salford Metropolitan Borough Councils. Greenways have been established along Sutton Brook and Rainford Linear Park. They are proposed for Mill Brook, Black Brook and Newton Brook.

Environmental Objectives:

The overall objective is to retain or recreate natural rivers within open, continuous river corridors, which are as wide as possible with a diverse range of habitats and physical features for people and wildlife.

This is to be achieved by:

- The retention of existing features of conservation interest.
- Actively promoting the enhancement and restoration of the river corridor, wherever possible and considered desirable.
- Seeking effective mitigation for any loss of conservation features.
- Safeguarding the special conservation interest for which sites have been designated.

Environmental Requirements:

Water Quality:

- Water quality should not deteriorate to a level such that sites of high local conservation value lose their general aquatic interest.
- Water quality improvements at some sites would enhance an existing conservation value.

Water Quantity:

- A variable flow pattern is required, where the monthly average flow reflects established or natural flow conditions in the river.
- Hydraulic continuity between the river and its flood plain is required where appropriate. The water is to be maintained at a high level where possible but particularly where wetlands occur. Spate flows should be allowed to inundate certain wetlands.

4.1.8 Conservation

- Spate flows should naturally cleanse the river channel.

Physical Features

- The conservation and enhancement of the diversity of natural river features, such as meanders, earth cliffs, areas of erosion and deposition, riffle and pool sequences and the presence of aquatic vegetation and marginal (water's edge) vegetation is essential.
- It is necessary to protect and enhance a diversity of river corridor habitats, including marsh, ponds, fringe and overhanging vegetation, bankside trees and hedges, old channels, flood plain habitats, species rich bank vegetation, uncultivated buffer strips, grassland and woodland. Also, the conservation of the features which give rise to, or contribute towards the specific features of the designated conservation areas should be protected.
- The channel cross section needs to be appropriate for the river flow pattern.
- Assistance with the promotion of less intensive farming in river corridors through incentives such as Countryside Stewardship schemes needs to be provided.

**Sankey/Glaze
Local Management Plan
Map 19**

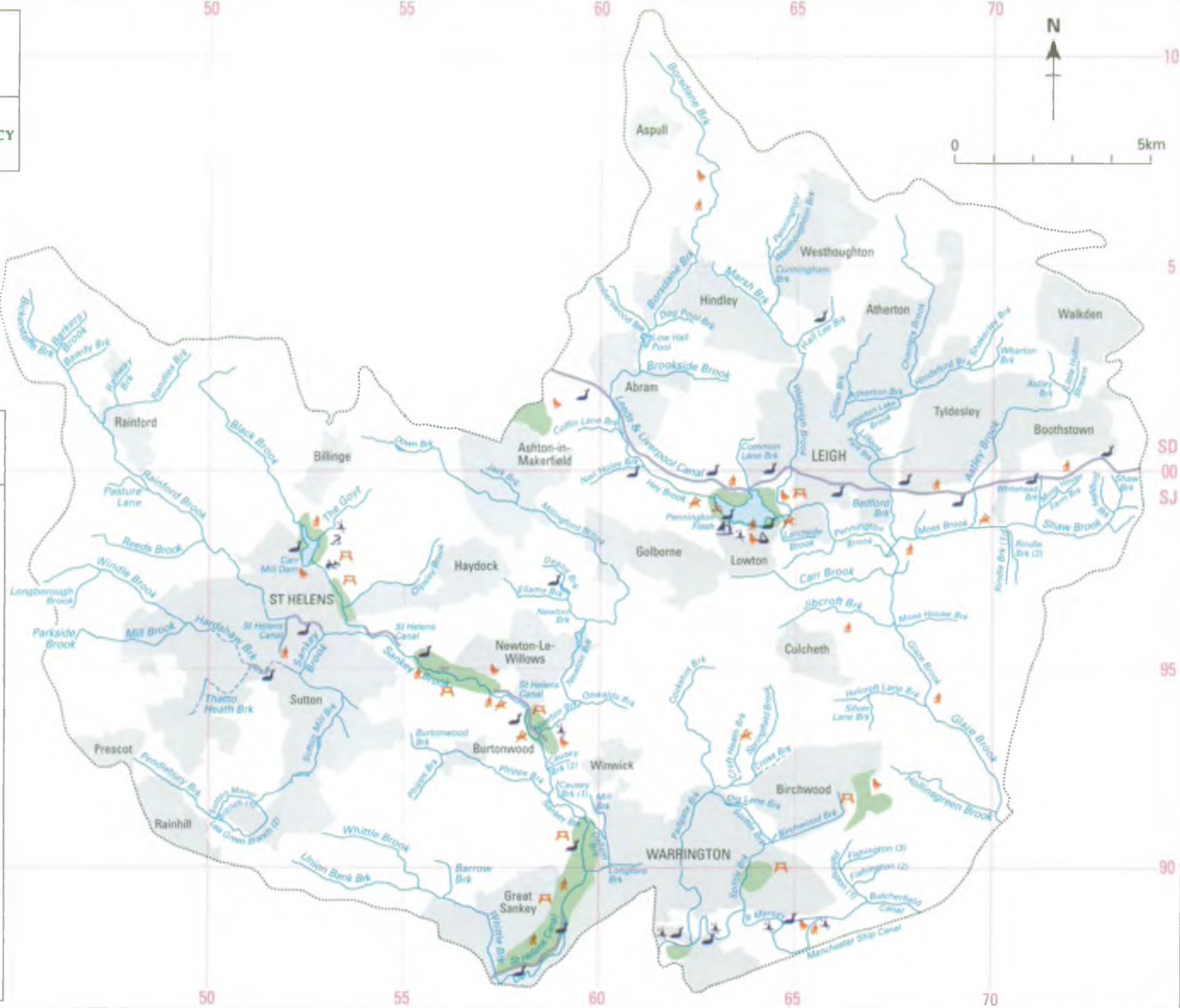


ENVIRONMENT AGENCY



Recreation and Amenity Sites Associated with Water

- KEY**
- Catchment Boundary
 - Watercourse
 - - - - - Culverted Watercourse
 - Canal
 - Built up Area
 - Established Park/ Recreation Area
 - 🎣 Angling
 - 🚶 Walking
 - 🦅 Birdwatching
 - 🐎 Horse riding
 - 🛶 Sail boarding
 - 🚤 Sailing
 - 🏂 Water skiing
 - 🚣 Canoeing
 - 🚤 Power boating
 - 🍷 Picnicing



4.1.9 Recreation And Amenity

General

The Agency has a duty to promote water based recreation.

This section deals with those sports, such as boating and canoeing, where direct contact with the water occurs, also general waterside recreation such as walking and angling.

Local Perspective

There are few established parks or recreational areas within the area. Waterskiing and powerboating takes place at Carr Mill Dam. Sherdley Park is a large municipal park where activities such as canoeing, fishing and climbing and abseiling take place. Numerous types of formal and informal recreation are provided for at Pennington Flash these include; windsurfing and sailing via, membership of Leigh and Lowton Sailing Club; footpaths; bridleways; picnic areas; birdwatching for which hides are provided, open land for football etc; and a children's play area. Both Pennington Flash and Three Sisters are managed by a warden service.

Areas for informal recreation are provided at Sankey Valley Park and Risley Moss Nature Reserve. Sankey Valley Park provides 13 miles of public open space and the area has many footpaths. It is mainly used by locals except for the through route cycle way which links up to the Trans-Pennine Trail. The wardens provide theme walks, environmental education for schools and groups and carry out maintenance work helped, on occasion, by volunteers. There is an information point for the park at Bewsey Old Hall. There are plans to improve the recreational facilities and access to Sankey Brook in the form of waymarking, interpretation boards, seating, creation of a Nature Trail, an increase in the number of cycleways etc. These activities are being implemented by various organisations and are part of Sankey Valley Initiative. Risley Moss Nature Reserve is an area of woodland and wetland, although the latter is not open to the public except on guided walks run by the wardens. There is an exhibition centre open to the public. There are permanent orienteering courses at both of these recreation areas.

Within the area, angling is restricted mainly to the stillwaters and canals of the area. However, the River Mersey below Woolston weir is now recognised as providing good fishing and Warrington Anglers now have the rights on a length in Warrington. In the spring of 1995 the first fishing match was held on this length of river. The only other length of flowing water which is fished is a short length of Pennington Brook after it leaves Pennington Flash and before West Leigh Brook joins it.

The Bridgewater Canal becomes the Leeds/Liverpool Canal as it passes through Leigh and all this length of canal as it runs through the Glaze area provides good coarse fishing, regulated by local clubs, with day tickets available. The St Helens Canal is fragmented within the Sankey area. Various lengths are fished and are controlled by a number of clubs.

4.1.9 Recreation And Amenity

The stillwaters of the area provide most of the angling available. These stillwaters are numerous and range from small farm ponds to the large waters of Pennington Flash and Carr Mill Dam. Most of the stillwaters are controlled by clubs with only a small number providing un-regulated fishing. The high population of the area means that there is a lot of pressure on the fisheries in the area. Improvements in water quality would result in the return of fish populations to the areas watercourses and an increase in available angling.

Environmental Objectives:

To obtain suitable water quality, water quantity, flow characteristics and physical river conditions, so as to provide a suitable environment for the different types of recreational and amenity pursuits, required by the local population and visitors to the area.

Environmental Requirements:

Water Quality:

- The minimum requirements are the protection of amenity value of the watercourse.
- The water should be free from surface films and unnatural floating material, litter and unpleasant odour.

Water Quantity:

- A flow pattern which provides suitable conditions for recreation, amenity and angling.
- A monthly flow pattern which does not fall below the established natural low flow conditions.

Physical Features:

- Sufficient access points for recreational and angling activities should be available.
- A mixture of open water, different flow rates and, instream and bankside vegetation should be available.
- Facilities are required where in river obstructions occur, for river users to be able to pass, for example, launch and retrieval points at weirs.
- Improvements, where required, in riverside recreational facilities especially in urban areas.

**Sankey/Glaze
Local Management Plan
Map 20**



ENVIRONMENT AGENCY



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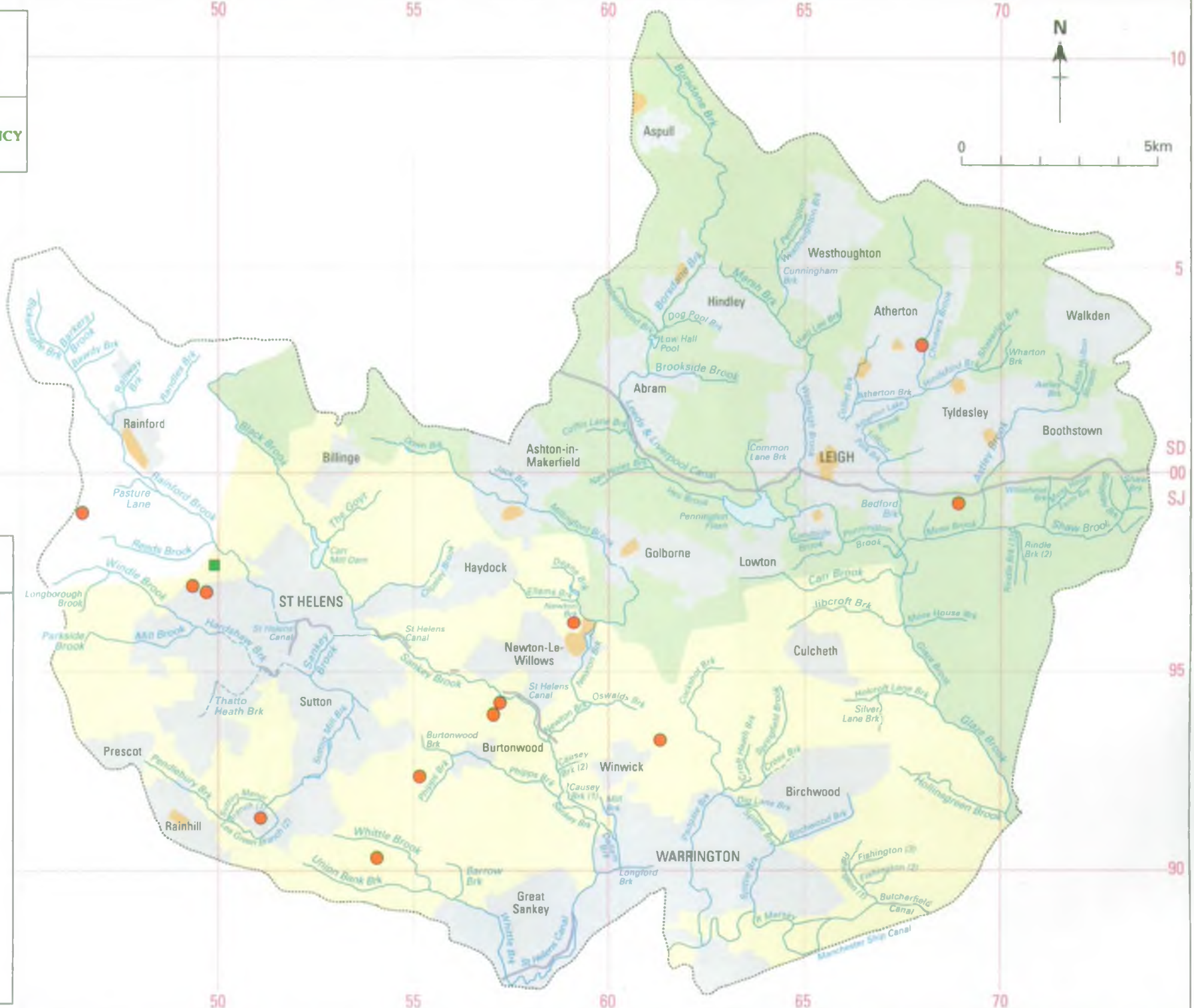
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Landscape and Heritage

KEY

-  Catchment Boundary
-  Watercourse
-  Culverted Watercourse
-  Canal
-  Built up Area
-  Conservation Area (built environment)
-  Registered Park and Garden
-  Scheduled Ancient Monument
-  Mersey Community Forest (Study Area Shown)
-  Red Rose Community Forest (Study Area Shown)



4.1.10 Landscape And Heritage

General

The Environment Agency has a duty to conserve and improve the natural beauty of inland and coastal waters, associated land, and to consider the need to protect and conserve buildings and objects of historic interest. As well as covering nationally important sites, local sites of value are included.

Opportunities for improvement are achieved through the activities of third parties, by the Agency working with local authorities, developers, and work undertaken as part of the Agency's capital and maintenance programmes.

Local Perspective

Past and existing landuses have influenced many watercourses in the area, principally through past industrial use (particularly on the Sankey) and present intensive farming practices. In addition, sections have been straightened and are regularly managed to alleviate flooding. As a result, many watercourses are straight, steep-sided channels with low amounts of tree and shrub cover and little visual interest either within the channel or along the banks. Some of these degraded sections run through high quality landscapes, such as the amenity landscape at Sankey Valley Park in Warrington, and the attractive farmland of parts of the lower River Glaze. There are localised areas of interest which have been retained, for example at Borsdane Brook, these are important areas to conserve.

An important heritage feature of the area is the Sankey Canal (also known as the St Helens Canal), the first canal of the Industrial Revolution which opened in 1757. The canal was abandoned by Act of Parliament in 1963 and had been partly filled in by the mid-1970's. Several brooks still run into and out of the canal, for example parts of Black Brook and Rainford Brook. Remaining canal structures are also an important feature of the system. The canal follows the line of Sankey Brook and uses the brook to supply water and provide an overflow for any excess. The Sankey Canal Restoration Society (SCARS) is investigating the potential for restoring the canal for navigation. Restoration proposals will need to take account of the effect on the environment, for example on water quality and aquatic ecology, the source of water supply, flood water drainage and the risks involved with excavating through contaminated land.

A range of initiatives now exist to improve the landscape quality within the area, through planning policies, changing management practices and improvement projects. The Sankey River Valley Initiative covers a range of projects, including landscape and heritage. Tree cover within the area is being promoted by the Red Rose Community Forest and the Mersey Community Forest.

Opportunities to enhance visually degraded watercourses should focus initially on those accessible to the public, for example through Sankey Valley Park. The Agency's aim is to work in partnership with public, voluntary and private sectors to promote attractive rivers, ideally set within continuous, open corridors linking urban population centres to the countryside.

4.1.10 Landscape And Heritage

Environmental Objectives:

The overall objective is to conserve and enhance the natural beauty and heritage value of watercourses.

This will be achieved by :

- the retention of existing landscape character and features
- seeking effective mitigation for any loss of landscape quality
- liaison with Local Planning Authorities and others to enhance river landscapes
- supporting initiatives to conserve heritage features and provide interpretation as appropriate
- liaison with the County Archaeologist for on the ground capital and maintenance works promoted by the Agency

Environmental Requirements:

- Watercourses should be features which are both pleasant to look at and walk alongside.

Water Quality:

- Watercourses should be free from litter, discolouration, surface films and unpleasant odours.

Water Quantity:

- Watercourses should reflect their natural or established level of flow. For heritage sites which are sensitive to water-level changes, the water table is to be maintained.

Physical Features:

- Watercourses should show physical features which are in keeping with the local landscape. These features may be natural or man-made in character.

4.1.11 Development

General

The Environment Agency is taking a pro-active role in the land-use planning system. This is in terms of advising Local Planning Authorities (LPAs) and developers on matters concerning air quality, the water environment and waste management. The aim is to ensure future development is sustainable and land use change is guided and implemented within the overall aim of protecting and enhancing the whole environment.

Past development has had a major influence on shaping the area. New development must be carefully considered, to recognise both the potential adverse effects, as well as the benefits change can have on the environment.

The Agency seeks to assess the likely impact of proposed development and pursue its aims and policy objectives via the planning consultation process. The final determination of decisions on planning matters rests with the LPAs, however, national government guidelines have advised on the need to consider Agency concerns when formulating a decision. Local Management Plans are an important part of the on-going dialogue with LPAs to help identify issues and where environmental problems and potentials can be most actively pursued.

The Agency has statutory regulatory powers and responsibilities to protect the environment. These powers are complemented by, and sometimes more appropriately carried out, especially where new buildings are proposed, by planning legislation. The Agency can provide an independent and authoritative view on a wide range of environmental issues. As a statutory consultee under planning legislation, for both development plan preparation and certain types of planning application, our advisory role provides LPAs with information to assess how development will impact on the environment. It also highlights to developers any Agency licences or consents which may be necessary, independent of any planning approval.

Future development is allocated and guided in LPA development plans. These are produced with respect to government guidance at national and regional levels. The former NRA produced Guidance Notes for LPAs on the methods of protecting the water environment through development plans and the Agency will assess development plan policies and allocations to ensure close liaison and advice on future development.

Local Perspective

The area in planning terms is administered by a number of LPAs. these are:-

Lancashire County Council
Cheshire County Council.
Salford Metropolitan City Council
Wigan Metropolitan Borough Council
St Helens Metropolitan Borough Council
West Lancashire District Council

4.1.11 Development

Warrington Borough Council
Bolton Metropolitan Borough Council
Knowsley Metropolitan Borough Council

The development plans for Cheshire and Lancashire CC are known as Structure Plans. They contain policies which provide the broad strategic planning framework for the County. More detailed policy and site specific proposals using the above framework to guide development in West Lancashire and Warrington DC are set out in their Local Plans. In the case of the Metropolitan parts of the former Merseyside and Greater Manchester Councils, LPAs prepare Unitary Development Plans (UDP). These are a combination of Structure Plan and Local Plan policies and proposals.

To help LPAs formulate plan policy and minimise the potential for development to increase flood risk, the Agency is carrying out surveys of floodplain, washlands and other land liable to flood, and to establish the effects of increased run-off on existing development. Once completed these surveys will be passed to LPAs to ensure planning decisions take account of flood risk issues.

In addition a number of groundwater vulnerability maps have been produced. These maps give a local perspective to national groundwater policy. District wide indicative maps have been produced for each LPA within the area. HMSO are currently printing Groundwater Vulnerability Maps on a wider scale. Map 16 covers the area. These maps are intended to increase awareness of those places where groundwater is most at risk. Those responsible for the planning of land will find them useful in learning about the potential impact proposals could have on groundwater.

APPENDIX 6 indicates the current state of development plan preparation within the area, noting LPA policies references are concerned with our aims and objectives.

It is hoped that the LPAs will work closely with the Agency so that the information and actions arising in this Plan can be integrated into their respective development plans. Close integration of environmental management and land use planning is considered an essential element of Agenda 21, the blueprint for sustainable development that was launched at the world summit held in Rio de Janeiro in June 1992. Many LPAs are now preparing Local Agenda 21 documents and Environmental Audits and the Agency will assist, where appropriate, to try and ensure decisions made in the planning field meets the needs of the present without compromising the ability of future generations to meet their own needs.

For the above reasons the Agency will seek to ensure the following policy objectives will be translated into land-use planning policy which will be considered when planning applications are assessed.

4.1.11 Development

Development Policy Objectives

Flood Defence

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

- by ensuring new development is not at risk from flooding and does not put other areas at risk;
- by encouraging continuous unobstructed areas adjacent to watercourses to ensure access for essential maintenance or flood flows.

Water Quality:

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

- by ensuring new development complies with the Policy and Practice for the Protection of Groundwater;
- by ensuring 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, 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;
- by ensuring leachate and drainage is controlled and monitored from contaminated land sites.

Water Resources:

To protect surface water and groundwater resources:

- by ensuring development can be or will be served by an adequate means of water supply which will not adversely affect existing users.

4.1.11 Development

Conservation 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 and the land physically and visually linked to them.

Waste Disposal and Contaminated land sites

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

- by ensuring development proposals are designed to control water pollution and landfill gas is controlled and monitored from contaminated land sites;
- by ensuring development complies with the Government's National Waste Management Strategy.

**Sankey/Glaze
Local Management Plan
Map 22**



ENVIRONMENT AGENCY



0 5km

SD
00
SJ

SD
00
SJ

95

90

50 55 60 65 70

Land Cover

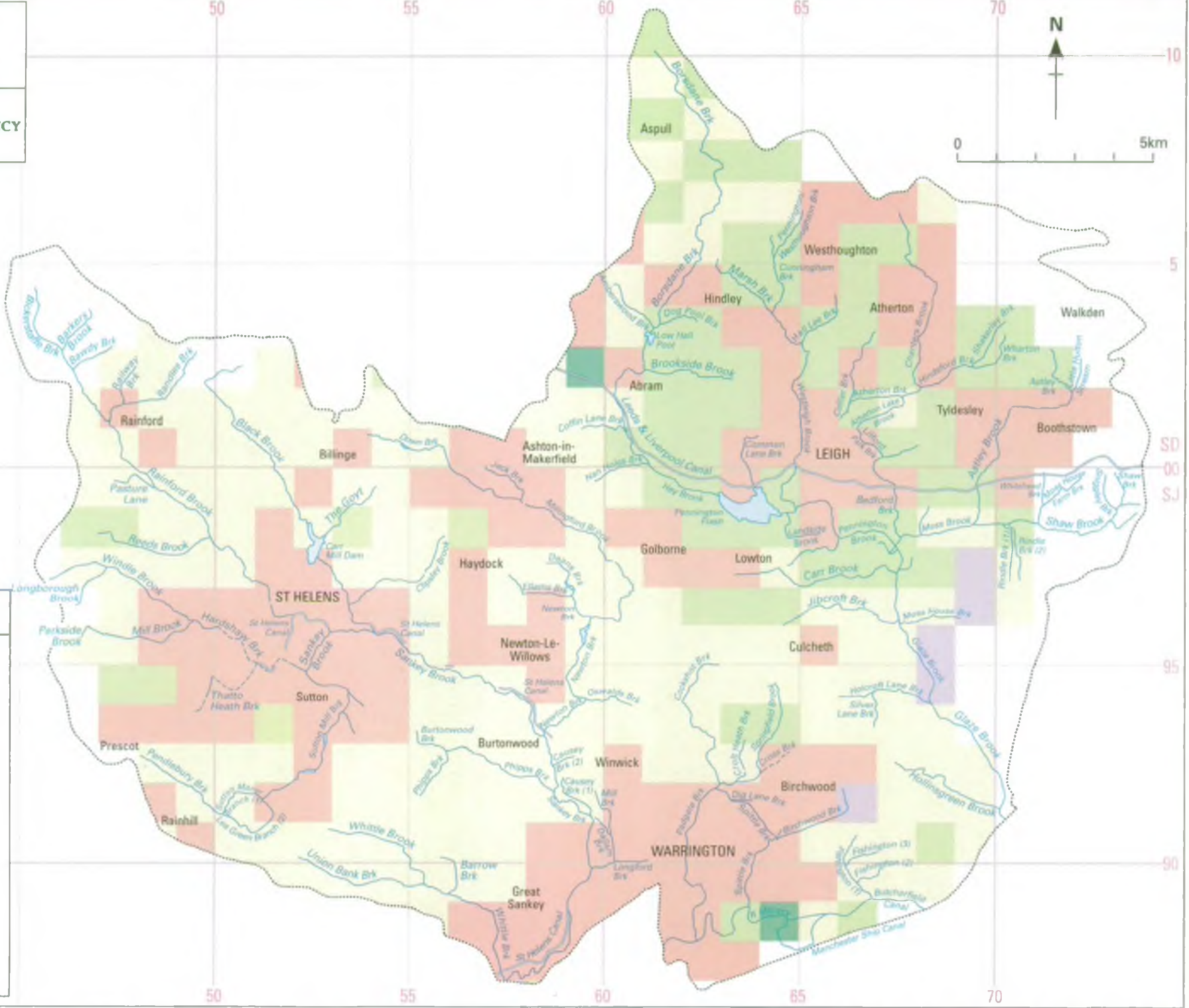
KEY

- Catchment Boundary
- Watercourse
- - - Culverted Watercourse
- Canal

**Dominant Land Cover
by 1km Square**

- Grassland
- Moorland/Heath
- Arable
- Urban
- Woodland

(Data Source: ITE Land Cover)



4.1.12 Agriculture

Over 80% of the land in England and Wales is used for agriculture and such a widespread use has a significant impact on the water environment. In some areas, intensive agriculture has contributed to the pollution of both to ground and surface waters, low river flows, increased risk of flooding and damage to fisheries and areas of conservation value.

The Agency enforces the Control Of Pollution (Silage, Slurry and Agricultural Fuel oil) Regulations 1991, which set down minimum standards for the design and construction of storage systems. The Agency also has a duty to regulate the abstraction of water for agriculture.

The Agency promotes good practice among farmers through several initiatives. These include working with farming groups and organisations and visiting farms. The aim is to develop best practise to prevent pollution and promote the Ministry of Agriculture Fiseries and Food (MAFF) free advice available from the Agricultural Development Advisory Service (ADAS) on pollution prevention together with the Codes of Good Agricultural Practise for the Protection of Water and Soil, which are available free from MAFF.

The Agency's aim is to ensure that farming practices do not compromise the use of surface and groundwater and do not threaten the ecology of the environment.

Local

Agricultural land in the area is of a generally high quality, with a percentage of grade one and two land (MAFF agricultural land classification scheme) which is above the national average. This is a result of the good soil types, including large amounts of peat, and the good drainage found in most of the area. The area is generally low lying and flat which makes it easy to cultivate. Nearly half of the available land is used for crops or fallow with another third used for long term (over five years) grassland. The amount of agricultural land now designated as Set-Aside has increased in recent years and now stands at approximately six percent.

There has been a general reduction in the amount of crops grown in the area, both cereals and horticultural, although the percentage of wheat, field beans and dry peas grown has increased substantially.

A major agricultural change in the area has been a move towards lowland sheep farming, which has seen a rise of over three hundred percent in the total head over the last ten years to 20,500. This reflects the favourable support given for the production of sheep meat. The number of cattle in the area has increased, with a move away from dairy farming and an increase in beef production. This change can be seen as beneficial to the environment, because, the dairy industry, generally, creates more potential pollutants in the form of slurry and silage than beef production.

4.1.13 Industry

General

Water is used by industry in large quantities for manufacturing and also for cooling purposes. In some areas there was heavy abstraction of underground water supplies. These industrial abstractions resulted in lowered water tables, and historical pollution has also resulted in contaminated land and underground water supplies.

Today the Agency is responsible for regulating industrial abstraction, discharge and waste disposal within rigorously enforced consents and also investigating complaints about industrial activity. Emissions from industry are controlled by the Agency through the concept of Integrated Pollution Control (IPC). Processes which are subject to IPC were defined as "Part A" processes in the Environmental Protection (Prescribed Processes and Substances) Regulations 1991 (as amended). Operators with IPC authorisation will be required to monitor their emissions, report any unauthorised releases and may be required to carry out improvements.

The Agency's objectives for the regulation of industry are to ensure that its economic growth and development does not adversely affect the environment, water resources and the ecology of the rivers or river corridors.

Local Perspective

The Sankey/Glaze area has an industrial heritage which has left a huge legacy within the area. The chemical industry in the St Helens area was one of the first industries to have legislation set down to reduce its polluting discharges. Other industries that existed in the area were cotton mills, breweries, glass making and industry associated with the coal mining in the area.

The recession has resulted in a reduction in large industrial activity over the last two decades and now there are only a few remaining in the area. Large production sites that remain in the Sankey/Glaze, include, PPG in Hindley, Pilkingtons in St Helens, Lever Brothers and Tetley Walker in Warrington, Bass Charrington and AJ Barr.

This reduction in major industry has reduced the impact on the environment of industry, but, industry still has an impact in a different form. Industry has changed from major industries to smaller units that have been set up on industrial estates, trading parks and business parks, of which there are many within the area. These developments have different impacts on the environments and because of the many different companies found on each site it is often difficult to trace pollution. Impacts on the water environment result from wrong connections to the waste water systems, accidents, negligence, poor storage and the mishandling of oil, chemicals and waste. Sites within the area which have been identified as causing such problems with water quality include, Haydock Industrial Estate, Yew Tree Industrial Estate and Boston Industrial Estate.

4.1.13 Industry

IPC sites within the area are clustered around Warrington, St Helens and Wigan and include the production of chemicals, pharmaceuticals, specialist gasses, building insulation and non-ferrous metals.

Other environmental impacts associated with industry in the area are discussed in the section on waste disposal.

4.1.14 Mineral Extraction

General

Mineral working processes pose a variety of environmental threats, both whilst in operation and also in the legacy they leave behind. These threats include environmental impacts on ground and surface waters, impacts on visual amenity value subsidence and sites that require reclamation.

Areas of current or former workings pose a threat to ground and surface waters by exposing, at times, toxic spoil or veins of potentially toxic minerals to the weathering process. As a result, run off and discharges from quarries and mines can contain toxic and suspended materials that are harmful to aquatic life. Discharges from active sites are subject to normal discharge consent procedures. However, discharges from abandoned mines are not adequately controlled by law and many cause severe local problems.

In August 1995 the NRA signed memoranda of understanding with both the Coal Authority and RJB Mining Plc formalising its relationships and procedures in respect of non-operational mines and future abandonments. It is intended, in principle, that similar memoranda will be entered into with other private coal operators.

The removal of material from above the water table, during mineral extraction, reduces the opportunity for natural filtering and attenuation of pollutants, which will consequently enter the groundwater more readily. Summer spring flows can be reduced as a result of a loss of water storage capacity of the mineral that has been removed. Reclamation with impermeable material will increase the run off and reduces the recharge of groundwaters, whilst the use of mineral extraction sites for landfill waste disposal also poses a significant threat to groundwater quality.

There are planning controls in place to regulate all mineral extractions. The Agency is a consultee on such applications, and the final planning consent should contain conditions which control the operations in order to satisfy the Agency's requirements.

Local

Coal has been extensively worked in the past within the area. Extraction has taken place both by deep pit mining and by opencast mining. Although all the deep pits in the area have now been closed down, they still leave their legacy to affect the local environment. Opencast mining still takes place within the area and the Agency is involved in ensuring that its effects on the environment are minimised.

Sandstone is extracted in two areas within the area, these are at Winwick and a new site at Astley. Sand has also been exploited to the north west of St Helens, where drift deposits have been exploited for the glass industry. In the past there have been extractions of sand and gravel for aggregates, but, many of these sites have now been used as infill sites for domestic and industrial waste. Clay has also been and still is extracted in the area for brick manufacturing for, example at Mosedales at Rixton.

4.2 - 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

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

BED

The bottom of a river.

BERM

A shelf at the base of a bank at normal flows which gives extra channel width in high flows.

CHANNEL

A cutting in land along which a river flows.

CONFLUENCE

Point where two, or more, rivers meet.

COMPENSATION WATER

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

CULVERT

A man-made structure, for example a pipe, carrying a watercourse underground.

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.

4.2 - Glossary

DIFFERENT UNITS FOR FLOW MEASUREMENT

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

Conversion Table

m ³ /s	Mld	mgd
0.012	1	0.224
0.06	5	1.12
0.12	10	2.24
0.24	20	4.48
0.6	50	11.2
1.2	100	22.4

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.

DRY WEATHER FLOW

It is a selected flow that is not exceeded for ten successive days which is also referred to as a Q95 flow.

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.

4.2 - 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.

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.

LEACHATE

Liquid containing material in solution, draining from the ground.

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 NRA 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 its high permeability and porosity.

MARGINAL

At the water's edge

MINOR AQUIFER

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

4.2 - Glossary

NON AQUIFER

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

OCHRE

Iron based orange discolouration.

PASTURE

Semi-improved and improved grazed grassland.

POOL

A deep slowing 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.

RETURN PERIOD

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

REVETTED

Man made protection to prevent erosion of river banks. Generally low stone walling or timber piling.

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.

4.2 - Glossary

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.

SHOAL

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

STRATA

Layer of rock.

SPATE

Very high flows, usually associated with rain storms and often 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.

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.

4.3 - Abbreviations

AOD	-	Above ordnance datum
CSO	-	Combined Sewer Overflow
CSW	-	Contaminated Surface Water
DOE	-	Department of the Environment
EU	-	European Union
ESA	-	Environmentally Sensitive Area
EQS	-	Environmental Quality Standard
FWAG	-	Farming And Wildlife Group
HMIP	-	Her Majesty's Inspectorate of Pollution
IPC	-	Integrated Pollution Control
LPA	-	Local Planning Authority
MAFF	-	Ministry of Agriculture Fisheries and Food
MBC	-	Metropolitan Borough Council
NFU	-	National Farmers Union
NNR	-	National Nature Reserve
NRA	-	National Rivers Authority
NWC	-	National Water Council
NWW Ltd	-	North West Water Limited
QSL	-	Quality Survey Limit
RE	-	River Ecosystem
RQO	-	River Quality Objective

4.3 - Abbreviations

SBI	-	Site of Biological Importance
SSSI	-	Site of Special Scientific Interest
STW	-	Sewage Treat Works (also referred to as Waste Water Treatment Works)
SWQO	-	Statutory Water Quality Objectives
UDP	-	Unitary Development Plan
WML	-	Waste Management Licence
WRA	-	Water Resources Act
WwTW	-	Wastewater Treatment Works

4.4 - Water Quality Classification

River Quality Objectives

The Agency has strategic targets known as River Quality Objectives (RQOs) providing a basis for water quality management decisions. In the past the National Water Council (NWC) classification scheme for water quality has been a fundamental element of RQOs. This is now being superseded by new classification schemes prescribing standards for specific uses. The first set of standards to be developed, in the River Ecosystem scheme, relates to the chemical quality requirements of the different types of aquatic ecosystem.

River Ecosystem River Quality Objectives (RQOs) for the rivers and canals of this catchment are proposed here for the first time. Objectives under this schemes will eventually become statutory targets when notices are served by the Secretary of State for the Environment giving them legal status. Although a formal public consultation will take place before the objectives become statutory, views on the proposals are sought at this stage.

The lengths of river and canal to which the objectives have been applied are largely the same as previously used for the National Water Council (NWC) system of classification and objectives.

It is also possible to relate the classes of the previous NWC objectives to the River Ecosystem scheme. This has been considered in the assessment of the proposed River Ecosystem objectives in addition to what the water quality is currently like and how this is predicted to change. Changes in water quality could arise for example due to improvements in consented discharges, improvements to farm drainage or changes in land use. Other assumptions have also been made such as that unless improvements are known to be in hand consented discharges contain the maximum permitted pollutant load.

Objectives proposed for non-statutory RQOs and ultimately statutory WQOs will be achievable within 10 years. The dates given for compliance will become part of the statutory obligation. In predicting improvements it has only been possible, therefore, to consider expenditure which is firmly committed. The recent negotiations relating to water company expenditure are of particular significance here.

It is envisaged that it will be possible to review statutory WQOs after 5 years.

For the purposes of this plan long-term River Ecosystem RQOs have also been considered. These are achievable aspirations for the catchment. Achievement of proposed long-term RQOs for some stretches may take longer than 10 years or require expenditure not available before then. No dates have been ascribed to these.

Statistical procedures have been used to assess whether samples collected for particular river lengths are within the appropriate chemical standards. Failures have been distinguished as either marginal or significant.

4.4 - Water Quality Classification

The Definition of the RE classes in chemical terms can be equated with the broad description with particular reference to the fish population that could be expected to be supported by the ecosystem.

- Class RE1: Water of very good quality (suitable for all fish species).
- Class RE2: Water of good quality (suitable for all fish species).
- Class RE3: Water of fair quality (suitable for high class coarse fish populations).
- Class RE4: Water of fair quality (suitable for coarse fish populations).
- Class RE4: Water of poor quality (likely to limit coarse fish populations).
- No class Water of bad quality (in which fish are unlikely to be present).

Biological Classification

The biological classification method used in this report depends on the identification of freshwater invertebrate specimens to family level. Each family has a biological score allocated to it, the value being related to the tolerance of the whole family to pollution. Pollution sensitive species receive the highest score, up to a maximum of ten for some stoneflies, and pollution tolerant species such as worms are given the lowest value of one. Abundances are also recorded to make an assessment of the dominant invertebrates in the sample.

A number of indices are applied to the invertebrate information collected for each reach of river and one of five biological classes listed below is assigned.

Biological class B1 - Very Good Biological Quality

The fauna recorded is extremely diverse and dominated by a variety of stoneflies (Plecoptera) and mayflies (Ephemeroptera, not including the family Baetidae). Such groups require high levels of oxygen (>80%). The dominant invertebrates found are generally intolerant of pollution, particularly ammonia and organic pollution preferring clean, well oxygenated streams. Some stonefly species are able to tolerate raised acidity levels though most mayfly species are unable to tolerate this condition. Where such a diverse fauna is found, visible evidence of pollution is very rare.

Biological class B2 - Good biological Quality

The indicative fauna is diverse and typically dominated by mayflies and caddis fly larvae (Trichoptera) with stoneflies in lower abundances than found in biological class B1. A few more pollution tolerant species such as shrimps are found though the fauna still requires above average oxygen levels (>60%). The fauna will tolerate low ammonia levels and very mild organic pollution. Visible evidence of pollution is usually absent.

4.4 - Water Quality Classification

Caddis fly larvae tend to be less sensitive to organic pollution than stoneflies and mayflies. Shrimps (Gammaridae) are reasonably tolerant of mildly enriched conditions but will not tolerate conditions of increased acidity. Sometimes though, shrimps will form communities adapted to high levels of heavy metals.

Biological class B3 - Fair biological quality

The fauna is moderately diverse but typically dominated by more pollution tolerant families of mayflies (Baetidae), caddisfly larvae and shrimps. Pollution tolerant water hoglice (Asellidae) are frequently present together with significant numbers of worms and midge larvae. Stoneflies are typically absent. Oxygen saturation (>40%) is typically sufficient to support pollution tolerant mayflies. Visible evidence of pollution may be present.

Biological class B4 - Poor biological quality

This class is indicated by a restricted fauna composed of pollution tolerant species. Water hoglice worms and chironomids (midge larvae) are frequently present whereas pollution sensitive stoneflies are absent. Water hoglice are fairly tolerant of high salinities, low pH and high metal concentrations. Shrimps and pollution tolerant mayfly species (Baetidae family) are only occasionally recorded. The fauna is able to tolerate low oxygen levels (>10%) and occasionally stagnant, anaerobic conditions which may be associated with significant organic pollution or mild toxicity. Visible evidence of pollution is typically seen.

Biological class B5 - Very poor biological quality

This class is indicated by a very restricted fauna tolerant of severely polluted conditions. A macroinvertebrate fauna may in fact be absent altogether. Only species capable of utilising very low oxygen levels are found, for example, chironomids and worms. The fauna may be composed of very low abundances of a few species indicating toxic conditions or very high numbers of pollution tolerant species such as red midge larvae (bloodworms) or worms indicative of gross organic pollution. Visible evidence of pollution is very common.

High number of red midge larvae (bloodworms) are particularly indicative of pollution by sewage or farm effluent. Worms are also tolerant of organic pollution.

4.5 - AMP 2 Programme

Asset Management Plan 2 (AMP2)

AMP 2 programme 1995 - 2000
Unsatisfactory sewer overflows.

Within the catchment the following unsatisfactory combined sewer overflows are to be improved over the first five years of the AMP 2 process -

Catchment	NWW Reference	Stream	Grid Reference	Location
Sankey	WAR0023	Phipps Brook	SJ 5702 9268	Green Jones Brow
Glaze	WIG0049	Borsdane Brook	SD 6103 0252	Platt Bridge
Glaze	WIG0125	Dog Pool Brook	SD 6265 0364	Hindley
Glaze	WIG0203	Dog Pool Brook	SD 6265 0364	Hindley
Glaze	WIG0132	Borsdane Brook	SD 6188 0808	Aspull
Glaze	SAL0156	Shaw Brook	SD 7320 0050	Boothstown
Glaze	SAL0174	Ellen Brook	SD 7267 0165	Salford
Glaze	SAL0003	Stirrup Brook	SD 7171 0036	Salford
Glaze	SAL0002	Stirrup Brook	SD 7171 0036	Salford
Glaze	WIG0050	Brookside Brook	SD 6175 0235	Hindley
Sankey	WIG0039	Millingford Brook	SJ 6104 9713	Golborne
Sankey	WIG0037	Millingford Brook	SJ 5862 9893	Ashton
Sankey	WIG0104	Millingford Brook	SJ 5854 9897	Ashton
Sankey	WIG0105	Millingford Brook	SJ 5854 9897	Ashton
Sankey	WIG0106	Millingford Brook	SJ 5857 9897	Ashton
Sankey	WIG0118	Millingford Brook	SJ 5841 9901	Ashton
Sankey	WIG0147	Millingford Brook	SJ 6058 9730	Golborne

4.5 - AMP 2 Programme

AMP 2 programme 2000 - 2005

The following list of schemes are those put forward for **consideration** in the second five years of the AMP 2 process


Catchment	NWW Reference	Stream	Grid Reference	Location
Glaze	WIG0076	Pennington Brook	SJ 6686 9848	Leigh
Glaze	WIG0079	Pennington Brook	SJ 6689 9848	Leigh
Glaze	WIG0068	Pennington Brook	SJ 6458 9830	Glazebury
Glaze	WIG0074	Pennington Brook	SJ 6581 9900	Leigh
Glaze	WIG0077	Pennington Brook	SJ 6653 9845	Glazebury
Glaze	WIG0080	Pennington Brook	SJ 6581 9900	Leigh
Glaze	WIG0142	Double Cop Brook	SJ 6468 9830	Glazebury
Glaze	WIG0144	Pennington Brook	SJ 6658 9842	Glazebury
Glaze	WIG0197	Pennington Brook	SJ 6685 9848	Glazebury
Glaze	WIG0082	Bedford Brook	SJ 6725 9970	Leigh
Glaze	WIG0100	Atherton Brook	SD 6689 0001	Leigh
Glaze	WIG0101	Pen Leach Brook	SD6747 0038	Leigh
Glaze	WIG0198	Bedford Brook	SJ 6691 9998	Leigh
Glaze	WIG0199	Bedford Brook	SJ 6721 9972	Leigh
Glaze	WIG0085	Collier Brook	SD 6690 0333	Leigh
Glaze	WIG0200	Atherton Brook	SD 6631 0238	Leigh
Glaze	WIG0206	Atherton Brook	SD 6636 0220	Leigh
Glaze	WIG0207	Collier Brook	SD 6686 0329	Leigh
Glaze	WIG0086	Hindsford Brook	SD 6870 0254	Atherton
Glaze	WIG0087	Hindsford Brook	SD 6864 0215	Atherton
Glaze	WIG0136	Shakerley Brook	SD 6874 0229	Tyldesley
Glaze	WIG0205	Hindsford Brook	SD 6821 0203	Leigh
Glaze	SAL0004	Shaw Brook	SD 7358 0209	Salford
Glaze	WIG0064	Westleigh Brook	SD 6485 0029	Leigh
Glaze	WIG0069	Westleigh Brook	SJ 6478 9982	Leigh
Glaze	WIG0071	Westleigh Brook	SD 6498 0168	Leigh
Glaze	WIG0151	Hindsford Brook	SD 6816 0200	Tyldesley

4.5 - AMP 2 Programme

Catchment	NWW Reference	Stream	Grid Reference	Location
Sankey	STH0054	Sutton Brook	SJ 5246 9497	St Helens
Sankey	STH0009	Sutton Brook	SJ 5345 9422	St Helens
Sankey	STH0056	Sutton Brook	SJ 5267 9463	St Helens
Sankey	STH0060	Sutton Brook	SJ 5347 9438	St Helens
Sankey	STH0061	Sutton Brook	SJ 5345 9416	St Helens
Sankey	STH0062	Sutton Brook	SJ 5345 9418	St Helens
Sankey	STH0063	Sutton Brook	SJ 5322 9364	St Helens

4.6 - ENVIRONMENT AGENCY INTERESTS AND LPA DEVELOPMENT PLAN POLICIES

	LPA Plan Policies which aim to protect the environment (their plan policy reference shown)			
DEVELOPMENT PLAN NAME & STATUS	AIR, WATER QUALITY AND WATER RESOURCES	FLOOD DEFENCE	FISHERIES RECREATION & CONSERVATION	MINERALS, WASTE DISPOSAL & CONTAMINATED LAND
Cheshire Adopted Structure Plan 2001	ENV 18 ENV2 ENV14	-	ENV 12 TR9 TR12	MWD 2, 5, 19, 20
Lancashire CC Structure Plan. Awaiting modification following Inspectors Report.	Policy 6 Policy 10	Policy 8, 15	Policy 7, 9, 13, 54, 55	Policy 63, 66, 67, 68, 69, 70, 76
Knowsley MBC Deposit UDP Awaiting Inspectors report	EN1B (ii) PWM1 PWM1 (ii)	EN1B (i) Gen 7	EN 10(iv)	PWM1 PWM4 PWM5 PWM12
West Lancashire DC Draft Local Plan Awaiting publication of Deposit Plan	P2, P3, P4, P5 U3, U4	U5 P7	LN5, LN14, LN15, LN16, LN18	P1 M2 M3
Wigan MBC adopted UDP	EN3	-	EN1, L5, L4 EN4, EN5B, EN5, EN7H	M2, M6A, M4, WD1
St Helens MBC Deposit Draft UDP Awaiting inspectors report	GEN 1 ENV 25	ENV 30	ENV 3, REC5 ENV 7 REC 7	ENV 26 S10MIN1 S11MIN2 WD1 WD2
Warrington BC Modified Deposit Local Plan Public enquiry currently being held	DC1 DC2 ENV 23 AND 24	ENV 10 ENV 11	ENV 3, ENV5, ENV 15 ENV 16, ENV 17	ENV 18 AND 19 ENV 20
Bolton MBC adopted UDP	CE7	-	CE16/4, R4/1 CE 17	M2/1, WD4 WD3/1
Salford MCC adopted UDP	EN9 EN22 DEV1	DEV 1	EN5 EN6 EN16	MW8 MW15 DEV 1 DEV 10



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