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# THE RIVER LAGAN

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COVER ILLUSTRATIONS

River Lagan from Sand Quay 1843

Industry and amenity usage shown.

(Reproduced by lithograph from painting by J. Howerd-Burgess,  
published by James Madill, Donegal Place, Belfast)

River Lagan from same position 1979

No industry and no amenity usage shown.

(Photograph May 1979)



### ACKNOWLEDGEMENTS

The Authors wish to record their thanks for the considerable assistance they received in compiling this Report from the Sports Council for Northern Ireland and the Northern Ireland Council of Physical Recreation. A debt of gratitude is also *owed* to those professionally qualified in the areas of engineering, biology, chemistry and bio-chemistry who freely gave of their time and expertise.

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THE RIVER LAGAN

STRANMILLIS WEIR TO THE SEA

Report of the Northern Ireland Council for  
Physical Recreation and Sports Council for  
Northern Ireland Joint Working Party

on

the State of the River Lagan  
for Amenity and Recreational Use

May 1979

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## QUOTES

1. "Where Lagan stream sings lullaby, there blows a lily fair"  
(Opening line from "My Lagan Love" - Traditional Ulster Folksong)
2. "The spot where the Blackwater (Blackstaff) entered the Lagan at Ormeau was a favourite bathing place for the men and boys of the district".  
("As I Roved Out", C. O'Byrne)
3. "So abundant were the catches (of salmon from the River Lagan) that as well as supplying Belfast and neighbourhood, quantities were exported".  
(Taken from a contemporary account of 1840)
4. "The U.K.'s Biggest Cesspool"  
(Headline from "Rod & Gun", July 1978; Article on Lough Neagh)
5. "I notice in the papers circulated that DOE is absent and noticeably so as they should be seriously concerned with this whole matter and I would suggest that they are the main cause of the problem".  
(Proceedings of a Symposium on Lough Neagh "The Algae Problem and its Solution" August 1978)
6. "Clouded, heavy deposit of black matter, giving off gas, small lumps of floating excrement".  
(Lagan Water Analysis, 1976)
7. "The Lagan Problems . . . might seem to derive from a failure or lack of will on the part of successive public authorities".  
(Department of the Environment Lagan Report 1978)
8. Mr. Ray Carter, Environment Minister, planting the first of the trees said the river should be one of Belfast's major natural assets . . . the major planting scheme (is) designed to improve environmentally the river and its environs while retaining its essential characteristics as an industrial water-course (our underlining)  
(Ulster Commentary, March 1979)
9. "Protect our environment from the Environment Department"  
(Headline from the Sunday News 18 March 1979)



10. "Dead fish on the rocks, no one can swim there  
 No water can be drunk from the Lagan  
 Old glass and bottle tops pollute the river more  
 Polluted river, polluted river, ah ah ah.

Some day the Lagan shall be cleaned  
 Boating and swimming in the water  
 No glass or bottle tops pollute the river more  
 Polluted river, polluted river, ah ah ah."

(Children's song quoted in BAN News, February 1979)

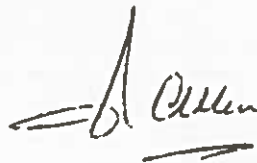
11. "No man was ever endowed with a judgement so correct and  
 judicious but that circumstances, time and experience,  
 would teach him something new, and appraise him of those  
 things with which he thought himself the best acquainted  
 he knew nothing; and that those ideas which in theory  
 appeared the most advantageous were *found*, when brought  
 into practice, to be altogether impracticable."  
 (Terence - A Roman Poet)

FOREWORD

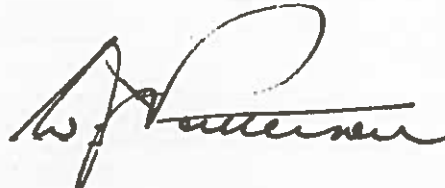
The importance of the River Lagan as a sporting and recreation amenity has been recognised by both the Northern Ireland Council of Physical Recreation and the Sports Council for Northern Ireland. Indeed, both bodies have expressed concern about the continuing deterioration of this major recreational asset over a number of years. Consequently, a Working Party was formed, and in this report the authors have sought to identify the problem, establish the parameters within which solutions should be found and put forward recommendations for the consideration of a variety of agencies including ourselves.

We wish to express publicly our sincere thanks to the Working Party for producing a most comprehensive and useful document. Our business is concerned with the development of sport and physical recreation and we recognise that the contents of this report have a very much wider significance. Therefore we have agreed that the report should be published and made available as a discussion document.

We commend it for the consideration of the many statutory and voluntary bodies concerned with the River Lagan and we hope that it will inspire thoughtful discussion, constructive comment and, above all, useful action.



SIGNED .....  
J.H. Allen, Chairman, SCNI



.....  
W.J. Patterson, Chairman, NICPR

## INTRODUCTION

### (i) Background

At an Annual General Meeting of the Northern Ireland Council of Physical Recreation (NICPR) in November 1974 complaints by several interested sporting bodies about the condition of the River Lagan led to a meeting which resolved to set up a joint NICPR/Sports Council for Northern Ireland Working Party with the primary aim to 'secure the improvement of the River Lagan between Queen's Bridge and Stranmillis Weir for amenity and recreational purposes'. The Working Party decided as its immediate objective to investigate the facts relating to the City stretch of the River about which in the past there has been so much comment and protest, both public and private. Indeed the problem has made a regular minor appearance in local politics over the last 30 years only to pass from the public eye again with no further progress being made. Whilst this report deals primarily with the City stretch of the River, reference to the Lagan above Stranmillis Weir and in the Belfast Harbour was found to be essential.

### (ii) Authors of the Joint Working Party Report and Background of Involvement in the Problem

K. E. G. Morrow (Chairman)

A Belfast born, practising solicitor at present living close to the upper Lagan. A city resident all his life and educated at Harding Memorial P.E.S., Belfast Royal Academy and Queen's University. His sporting interests include offshore cruising and swimming in which sport he represented Wellington Swimming Club. First became aware of the Lagan problem in the late 1950's when the Lagan swim, for which he was entered, was cancelled. Took up rowing at Queen's University and has had a distinguished career which included Q.U.B. Senior VIII (1960) and Ireland (1962). During 20 years activity in rowing and coaching has been Captain of Belfast Commercial Boating Club, Belfast Rowing Club and Lady Victoria Boat Club, and more recently has been involved in rowing development at Stranmillis including the development of the new boathouses of Queen's University, R.B.A.I. and Belfast Rowing Club. Represents the Ulster Branch of the Irish Amateur Rowing Union on the Northern Ireland Council of Physical Recreation.

The history, conservation and restoration of the city are strong interests. Revival and renewal of public amenities in conjunction with housing re-development and the identification of the river as a central feature offering doorstep facilities to the city communities is a close interest.

J. S. D. Gilmore

As a member of Belfast City Council representing 'C' Division he has served on the Gas Committee, the Parks Committee and has been a prominent member of the Belfast Education and Library Board. Educated in Porter's Memorial School Belfast, he has seen service in the Palestine Police and in the Malayan Police during the period 1946-1958. A life-time interest in sport has seen an involvement in association football, rugby, cricket, hockey, athletics, bowling and boating. Currently a member and past commodore of the Stranmillis Motor Boat Club and the Ulster Offshore Power Boat Club, Donaghadee. 'Dixi' Gilmore is a member of the NICPR Executive and is Chairman of its Outdoor Activities Committee.

Close community interest in the University/Ormeau riverside area and concern about the effect of the deteriorating river environment on the adjacent living areas has led to a strong desire to see the problems tackled as a matter of urgency and a wish to see the river and its surrounding areas developed as an amenity to the existing and re-developed housing areas.

E. T. Morahan

A Belfast resident for most of his life he was educated at St. Mary's Primary School, Cushendall, St. Vincent De Paul Primary School, Ligoniel, St. Malachy's College, Belfast and Universities of Queen's Belfast, Oxford and Hawaii. Professional qualifications in Economics, Agricultural Economics and Resource Economics led to employment with the Ulster Farmers' Union and Water Resources Research Centre (U.S. Department of the Interior funded). He wrote Report on Water Institutions in Hawaii. Sporting interests include sailing, scuba diving, surfing and rowing. Has rowed on the Lagan for 20 years during which time has represented Queen's University Boat Club, Oxford University Boat Club, Keble College Oxford Boat Club, London Rowing Club and the Metropolitan Rowing Club at Henley Royal Regatta and was an Olympic Trialist in 1972. Is currently a member of Belfast Rowing Club, Lady Victoria Boat Club, Leander Club and is Vice-President of Queen's University of Belfast Boat Club.

Mr. Morahan is presently working in research and living near the river in the University area. He believes that the neglect of the Lagan is the destruction of an asset which should be readily available to the less affluent sections of the city community and leads him to campaign for the creation of water-based recreation opportunities in step with inner city renewal.

(iii) The Report

- (a) investigates the uses of the River;
- (b) identifies actions by Government to regulate these uses;
- (c) describes the present situation on the River;
- (d) analyses the failure of Government in this regard;
- (e) makes recommendations for improvement.

This Report is not intended to be a purely expert and fully comprehensive treatise on the historical, economic, sociological, scientific or legal aspects of the problem. However, the Working Party found that these aspects had nowhere been properly examined and related as being the component parts of the entire problem. Accordingly, although for example the water analysis undertaken deals with the extremes of river/tidal conditions and ordinary dry and wet conditions (excluding drought conditions) and in our opinion therefore justifies the relevant conclusions of this Report, it is acknowledged that further expert research would be required to complete the shades of the overall picture. Indeed in this and all of the other aspects it is hoped and anticipated that this Report will be of assistance in enabling a common understanding to be established between the legal, scientific, planning, economic and administrative experts in their individual studies of this pressing problem. Disagreement with some of the content of this Report is also anticipated but discussion is always more useful if carried on within a framework of basic factual knowledge.

It is therefore hoped that a more comprehensive grasp of this problem will result from the Working Party's efforts.

CHAPTER 1 : USES OF THE RIVER - PAST AND PRESENT

- 1.1 Historical Background
- 1.2 Present Day Uses
- 1.3 Reasons for Formation of Working Party

## 1.1 Historical Background

### 1.1.1 Transport and Industry

Belfast, like many cities, developed around the lowest crossing point of the major river in the area, when the only way to cross was by wading. The area which is now the centre of the City was largely mud-flats and swamp, and the path through this area crossed the river about the position of the present Albert Bridge (see Map I). The west bank of the river was more hospitable for habitation and the Farset River (see Map II) (now culverted under High Street) was the place where early jetties and riverside sheds were built. In time, as larger boats required deeper water, the quays moved downstream to below Queen's Bridge.

The Centre of the town remained on the west side of the Lagan, but the town spread south and eventually the small settlements on the east encroached over the flat area of Ballymacarrett towards the Lagan. The river channel became more clearly defined by dredging, and bridges were built. Because the land closest to the river was the most difficult to build on, it was not completed until the last stage of development of the city. Economic considerations dictated that it be used for industry and the buildings were constructed up to the river edge.

Thus it is hardly an exaggeration to say that the history of the River Lagan is the history of Belfast. Belfast initially developed due to the ford across the river where later a toll bridge was built. This same river was to allow Belfast to become a port of major significance. The Lagan from its source on Slieve Croob in the Mourne Mountains was largely in its natural form which facilitated water borne traffic from Belfast Harbour to Lough Neagh and to bring coal from Coalisland involved the digging of canal straights cutting off meanders of the river and the construction of related locks and weirs, major improvements being made especially during the 19th century after the completion of the Canal to Lough Neagh (1) in 1793. The river and its tributaries powered the textile mills on which much of the prosperity of Belfast was based and provided fresh water for its rapidly growing population.

In the length of river with which we are concerned, (Stranmillis Weir to the Harbour) the present structures consist of the McConnell and the Stranmillis Locks and Weirs and what remains of the dredged channel. The Ormeau, Annadale and Stranmillis Embankments were built between the wars to clean up the river banks along these stretches, and confine the river to its present width.

(1) SEE BIBLIOGRAPHY

The Stranmillis Weir was the first higher level of water above the tidal River Lagan, thus separating it at this point from the salt-water tidal rise and fall. With the winding-up of the Canal Company under the Lagan Navigation Act of 1954 the upper part of the Canal from Sprucefield to Lough Neagh was closed and the then Ministry of Finance made an order closing the lower section of the canal to Stranmillis in 1958. Due to the subsequent filling in of the section of the canal from Stranmillis Weir to Stranmillis Locks at Lockview Road the only remaining flow to the lower river was then over the Stranmillis Weir. At that time it was promised by Government that lock gates would be sufficiently maintained to keep the canal water-level. However, the lock gates were allowed to fall into disrepair and as a consequence water levels dropped and the canal cuttings became dry and overgrown. Indeed only an attempt by private enterprise at Shaw's Bridge kept the water higher above that bridge but this level is still some 3 feet below the old level.

#### 1.1.2 Drainage and Sewerage

The early settlers near Belfast built near streams in order to have fresh water for drinking and food preparation. As time went on, more houses and more traffic resulted in paved roads, with the streams channelled along the side to keep the roads dry underfoot. Eventually, storm drainage water was piped into buildings for washing and bathing. Greater knowledge of the connection between polluted drinking water and disease resulted in drinking water being treated, and flushing toilets were introduced to improve hygiene and conveniently dispose of excrement. At one time flushing toilets were discharged into piped drainage and then to open water courses, and the dilution was such that natural processes purified the water. Unfortunately, the concentration of large populations in small areas like Belfast broke down this balance and open streams could no longer provide the dilution required, especially in periods of low rainfall.

To alleviate this health hazard, the drainage was diverted into treatment works, where the sludge was dried out and the residual liquid passed through beds of stones to increase the surface area exposed to the air, speeding up the natural purifying process.

#### 1.1.3 Recreation and Amenity Use

In the 18th century amenity enjoyment of the river above Stranmillis Weir was common but it is also interesting to note that in the river below Stranmillis at a point now beside the Belfast Gas Works' Gasometers (see Map III).



"the spot where the Blackwater (Blackstaff) entered the Lagan at Ormeau was a favourite bathing place for the men and boys of the district",

and that to dissuade the citizenry from this pastime one James Hamilton in 1758 published in the local press a notice,

"for the grown-up and incorrigible of another class, I give them notice that I have this day day caused some hampers full of broken bottles to be thrown in the river opposite my field and after this notice they have themselves to blame for any injury they may receive therefrom".(2)

Perhaps this gentleman was one of the first of a long line of polluters of the Lagan.

Belfast in 1782 had a population of 13,000 (see Table I) and although records show that domestic and industrial effluent at the time was largely discharged into the river, this did not stop bathing in the lower Lagan right up to the mid-nineteenth century. Coarse and game fishing is also depicted in prints and paintings of the lower Lagan up to the mid-nineteenth century. The Lagan was once a first class salmon river with three fishing stations between Stranmillis and the Long Bridge (near Queen's Bridge). So abundant were the catches that as well as supplying Belfast and neighbourhood, quantities were exported. Indeed salmon were observed using the fish-pass at Stranmillis Weir until World War II. The relative cleanliness of the river in earlier times is evidenced by the small barnacles which can still be seen on the Ormeau Bridge and the sea shells excavated at Stranmillis during excavation of the slipway for Belfast Rowing Club in 1977.

#### 1.1.4 Contemporary Accounts and Government Activity<sup>(3)</sup>

At an early stage in the history of the city, concern was being expressed over sanitary conditions. Thus in an Act of 1800 penalties of up to 5 days hard labour were introduced for those who were guilty of pollution

"whereas emptying of soil or filth from privies, necessaries or bog houses, into or upon streets, lanes or other places in the said Town of Belfast..... are great and offensive nuisances".

This Act must not have been sufficient because in 1843 the Spring Water Commissioners and the Belfast Water Commissioners were complaining of the pollution of drinking water by cess-pools.

In 1852 the following statement appeared in a paper read to the Statistical Section of the British Association on "The Sanitary State of Belfast, with suggestions for its improvement":-

"this foul and tortuous stream (the Blackstaff) still, we regret to record, remains the receptacle of the refuse of upwards of 400 houses, besides factories and public institutions where many hundreds congregate or reside".

Pollution was still very much in evidence in 1859 because in that year in a Report "Commissioners Inquiry into the municipal offices of the Borough of Belfast" the following description appeared:-

"A large open dock called May's Dock, a nuisance of no ordinary magnitude, a receptacle of all sorts of filth".

However, some remedial work was carried out with the result that:-

"Not only its sanitary condition has been greatly improved the character of the town has been raised... the sewerage of the town has been improved, though in that respect much remains to be done".

But even then official neglect was found and the Commissioners complained that the Corporation had not used the powers given to them in the Act of 1847 to improve the River Blackstaff.

"It has been only lately that any extensive improvements by authority have attempted in this town" (their emphasis)

lack of action taken being attributed by the Commissioners to:

"the small sum of Parish-rate placed at their disposal however, and the limited extent of their powers"

only allowing the Corporation to:

"touch the surface of sanitary evils".

Only the advent of cholera and the possibility of it spreading from the congested working class areas to the middle and upper classes galvanised the city into making the necessary improvements.

"The mere inspection of a map of the drainage of any locality we can, with surprising accuracy, state, a priori where the disease is to be found".

The Commissioners saw the need for a body with independence and powers to improve, inter alia, the water system:

"We want a permanent Borough Board to superintend and regulate all sanitary matters, and be in constant occupation. No half measures, no special body for particular purposes or occasions or for a limited time, will suit our wants but a recognised Executive with adequate powers, is needed to protect the health interests of the town".

Thus a situation of serious pollution and administrative neglect was found by the Commissioners that is reflected more than a century later.

Legislation designed to overcome drainage and sewage problems passed during the 19th century is detailed in Chapter 2.4.

## 1.2 Present Day Uses

As societies develop changing uses of natural resources due to technology, economic growth, and tastes, occur. We will now look at how past uses have evolved and to the present uses of the river.

### 1.2.1 Transport and Industry

Whilst use of the river as a port has grown, upstream navigation use stopped in 1958 when barges ceased to use the stretch - both tidal and non-tidal - from the City docks to Newforge. Barge traffic supplying coal to the Gasworks ceased some few years later. Changes in industrial processes and greatly increased use of oil products for machinery and transport are reflected in the much increased oil pollution of the river through the single drainage system later described in Chapter 2 Section 2.2:

### 1.2.2 Drainage and Sewerage

With the rapid population growth in the City area (see Table I) the use of the river for sewage disposal greatly increased. Connections were made into the nineteenth century drainage system for the expanding suburbs of Belfast without any proper review of the loading as related to the overflows into the river and connections were even made from areas outside the 1918 City boundary (which is still the City boundary at the present time). With a very few exceptions, it is only since 1945 that separate sewerage systems and stations were constructed to service the outer growth areas.

### 1.2.3 Recreation and Amenity Uses

The latter half of the nineteenth century witnessed a second major increase in the size of Belfast and the first major impact of the deterioration of the quality of the river on amenity and sporting use was experienced.

Potential Lagan recreational benefits are as follows:-

- (i) angling
- (ii) swimming
- (iii) canoeing
- (iv) rowing
- (v) pleasure boating

- (vi) sailing
- (vii) power boating
- (viii) walking, spectating, etc.
- (ix) wildlife

All of the above activities have taken place on the river at some time but due to the heavily polluted condition of the river the true potential of the river cannot be realised.

Angling on the city stretch ceased some 70 years ago due to pollution. However, mackerel in proper season do intrude into the harbour and elvers can be seen during the summer at Stranmillis. However, these sightings are at times of cleaner waters after tides or early in the morning. Fish of undetermined type have been seen recently at Stranmillis during heavy rainfall and flooding. The major significance which can be attached to these facts is that if clean water was available at all times then abundant fish life would return and a salmon run to the upper Lagan could be re-established. Since angling is one of the biggest sports in the United Kingdom, the "inner city" potential here is considerable.

Before the advent of the public baths in the latter half of the nineteenth century swimming flourished in the lower Lagan and up until the 1890's galas were held there, the last known being at the Albert Bridge (beside the present Maysfield Sports Centre) in the late 1890's. The last Lagan swim took place in 1952 from Stranmillis to just above McConnell Weir and although popular with swimmers and spectators alike, it stopped because of the worsening pollution.

Canoeing did not fully develop as a sport until after the deterioration of river quality which made use of the city stretch of the river both unattractive and indeed dangerous since infection risk was a reality if normal canoeing exercises were being carried out. The Northern Ireland Sprint Championships were moved to a more acceptable venue in 1972. A Belfast school canoe league collapsed because of water quality in the Lagan. However, with in excess of 12 clubs and groups using the Lagan, but mostly the upper Lagan, the potential for the lower River with or without municipal facilities is clear.

Organised sport began on the river with competitive rowing by the Ulster Rowing Club and the Lagan Rowing Club and subsequently in the formation of the Belfast Boat Club in 1876<sup>(4)</sup> and the Commercial Boating Club in 1882. These last two clubs had premises at the

Quay near the present railway bridge, but moved to their present situation at Stranmillis in 1876 and 1977 respectively. The river is still used for training purposes but regatta rowing was moved to Castlewellaan Lake in 1974 because of the growing sludge banks which prevented side by side racing and the refusal of the non-Lagan Clubs to compete in these ugly and dangerous conditions. Nine clubs now use the river from 5 club-houses - all situated at Stranmillis. The only competitive rowing now held on the river is "Head of the River" time-trial long distance races from the harbour to Stranmillis. These races can only be held at high tide.

Pleasure Boating does not exist due to lack of facilities for the public which it would be unrealistic to create in the present circumstances. In the past only the two original rowing clubs provided such facilities for their members but there is potential for growth given proper surroundings.

Small boat sailing took place on the river on the stretch between the Ormeau Bridge and the Albert Bridge until 8 years ago but stopped due to a combination of hazard to health due to pollution and the reduction of the sailing area due to silting.

Power boating exists on the river and Stranmillis Motor Boat Club is situated at Stranmillis. However, without dredging of the sludge banks and the rehabilitation of the McConnell Lock, use of this stretch is severely restricted as vessels of a draught of more than 3½ feet cannot have access to the sea. Demand for such access in the city is a fact but most boat owners are forced by these circumstances to keep their craft at other more distant locations. The City Lagan would be an especially ideal and convenient place for winter maintenance work and Marina construction.

With the death of most sports spectating has also died away and with the increasing use of the riverside land for roads walking has become less attractive due to the noise and air pollution from traffic. It is ironic that part of the reason for the flight from the city to the suburbs (which causes the traffic) is because of the destruction of such city assets as the river.

Some wildlife has survived in the shape of nesting swans and migrating birds but it is sadly common to see such birds suffer from the pollution especially from oil products.

### 1.3 Reasons for Formation of Working Party

Water sports are popular with and should be available to all sections of the community.

Angling, canoeing, small boat sailing, swimming and rowing can provide sport and recreation for the majority of the city population if only remedial action is undertaken.

The water sports potential of this stretch of the river is huge and Government should plan to take full advantage of this.

The threat to existing sport, and more importantly the suppression of many others, led to the formation of this Working Party to investigate the reasons why the river could be in such a dreadful state.

At the first meeting of the Working Party it was decided that a full investigation was merited along the following lines:-

- (a) hydrology of the river
- (b) drainage and sewerage system of Belfast
- (c) water quality investigations
- (d) tracing of the past responsibility for the present state of the river
- (e) contacts with bodies found collectively to have river-related responsibilities
- (f) legal research

## 2.1 Hydrology of the River

Due to tidal ebb and flow, the quality of the river water varies greatly - especially above the McConnell Lock and Weir. The Weir obstructs the water flow and maintains a continuous minimum head of water covering most of the sludge banks above it. (One of the reasons for the construction of the weir during the 1930's was to stop the sludge banks smelling at low tide). When the tide has been out for its maximum time below the Weir the river quality above the Weir is at its worst due to the inflow during that time from the numerous outfalls above the Weir. Conversely when the tide is on the ebb for a short time, the water quality above the Weir is at its best, since the influx of tidal (and comparatively less polluted) water with its saline content has a "flushing out" effect on the water above the Weir.

Two factors governing the City stretch of the Lagan must at this stage be borne in mind. The first is that in periods of heavy rainfall with the high volume of cleaner water from above Stranmillis Weir coming down and combining with the inflow of comparatively cleaner water from the Lough, the height of the water is up to two feet on average higher than at times of low rainfall and the water quality in such a situation is much better than in a similar high tide situation when there has been little rainfall. Obviously this means that "high water" is much higher in the winter due to increased flow and higher natural tides.

The second factor is directly related to the first which is, given normal rainfall patterns, that the tide covers the Weir for a period of up to two hours per tide in the summer and four hours per tide in the winter.

The other rivers of Belfast are the Connswater which flows into the Lagan at the Harbour, the Farset which now flows under High Street to the Harbour, the Blackstaff (or Blackwater) which enters the river also from a covered course completed in 1882 at the Gasworks and the Milewater which enters the Harbour at its Northern end (see Map II). All of these rivers are heavily polluted due to the nature of the Belfast drainage system described below and where not covered cause offence to the City inhabitants in the Lower Falls, Newtownards Road and Gasworks areas of the City. Sampling was not taken by this Working Party of these rivers but the local inhabitants can verify the appalling situation of smell. Flooding also still occurs from the Connswater. The irony of Belfast "sewerage terminology" is seen when one sees that these rivers are assumed to be sewers and that use of the



Lagan itself for increased sewage disposal in the area in which the Blackstaff is used for this purpose is called "Blackstaff Relief"! (See Map II). Indeed, in a recent survey it was established that the Blackstaff was the most highly polluted river in the United Kingdom

most of the sewage banks above it. One of the reasons for the construction of the weir during the 1930's was to stop the sewage banks washing at low tide. When the tide has been out for its maximum time below the weir the river quality above the weir is at its worst due to the inflow during that time from the numerous outfalls above the weir. Conversely when the tide is on the ebb for a short time, the water quality above the weir is at its best, since the inflow of effluent (and comparatively less polluted) water with its saline content has a "flushing out" effect on the water above the weir.

Two factors regarding the City sewage of the Lagan area at this time are of some interest. The first is that in periods of heavy rainfall with the high volume of cleaner water from the numerous outfalls the water is very and containing with the inflow of comparatively cleaner water from the boggs, the level of the water is up to two feet on average higher than at times of low rainfall and the water quality in such a situation is much better than in a similar high tide situation when there has been little rainfall. Conversely this means that "high water" is much higher in the winter due to increased flow and higher rainfall.

The second factor is directly related to the first which is, given normal rainfall patterns, that the weir covers the weir for a period of up to two hours per tide in the summer and four hours per tide in the winter.

The other river of Belfast is the Downstream which flows into the Lagan at the Harbour. The fact which now flows under High Street to the Harbour, the Blackstaff (or Blackwater) which enters the river also flows a covered course completed in 1882 at the Harbour and the Millwater which enters the Harbour at its northern end (see Map II). All of these rivers are heavily polluted due to the nature of the Belfast drainage system described below and where not covered course effluent to the City inhabitants in the lower Falls. Newmarket Road and Gasworks areas of the City. Sampling was not taken by this Working Party of these rivers but the local inhabitants can testify to the appalling situation of some. Nothing else will occur from the sewerage. The town of Belfast "sewerage terminology" is seen when one sees that these rivers are assumed to be sewers and that one of the



## 2.2 The Drainage and Sewerage System of Belfast

The Belfast sewerage system as developed and greatly expanded in the latter quarter of the nineteenth century was a joint system - that is storm water and industrial effluent and domestic sewage were all combined in the one disposal drainage system and overflows from this system to cope with any excess rainfall thus added to the system were simply piped into the River Lagan at various points. The outfalls detailed in this Report (see Table III and Map III) are pipes from this system, connected to the River Lagan above high water mark for the purpose of preventing an "explosion" of the system through increase in loading at times of heavy rain thus preventing such disasters as the streets of Belfast being flooded and manholes being dislodged by water pressure.

A comparatively recent development which was completed in 1961 was a large outfall at the back of Botanic Gardens which was part of the Bog Meadows drainage scheme. In actual fact although this outfall was at that time publicized as part of the drainage of the Bog Meadows, in reality this outfall joined all of the sewers in its line all the way to the River Lagan (not publicized!). This outfall (ironically called the "Blackstaff Relief Culvert") puts into the river the greatest outflow by far and its content shows not only human sewage but industrial effluent such as used oil which clearly comes from the industrial area which this outfall now drains since industrial development has now taken place in the Bog Meadows area. Further, this outfall also is connected to the Lisburn RDC sewerage system, thus again using the Lagan as a method of disposal for an area really outside the Belfast system (see Map II).

The difficulty with this joint drainage system is that the drains are basically designed as storm water flows, and when storm water flows through them, the excess must be passed straight through the treatment works. In addition, some of the pipes installed to direct the sewage to the treatment works are only of sufficient capacity to take the normal sewage flow, and when storm waters come down the old combined drains, these must be allowed to over-flow into special storm overflows which discharge direct to open water courses such as the Lagan.

For comparison purposes, the average flow in a storm drain with no sewage is about 15 litres per minute per hectare. There is a situation during a major storm/heavy rainfall when only 3% of the total flow is going into the treatment works, the rest going straight to open water.

Bearing in mind that the storm discharge has sewage mixed through it, accordingly the 3% going through the treatment works may contain only its share of the sewage, and thus only 3% is actually treated.

A worse situation occurs more frequently. This is when a minor storm runs into the drains, causing a flow of say 100 litres per minute total. If the diversion pipes can only cope with 30 litres per minute to the treatment works, 70 litres per minute, or 70%, will go into the storm overflows and, because of the mixing take 70% of the sewage with them. With the frequent occurrence of prolonged periods of light rainfall in our climate, this happens very often with consequent heavy pollution of the Lagan (see Appendix and accompanying diagram for a fuller explanation).

As is self evident by their nomenclature these outfalls are intended to be for "storm relief" at a certain volume level but the findings of this Working Party are that these outfalls discharge variable amounts of pollutants at all times because they do not and indeed cannot function correctly.

Due to the dilution factor of tide and rainfall the effect of this continuous pollution on water quality is much less at times of high tide and heavy rainfall. This is the reverse of the aim of this type of sewerage system which is supposed to ensure that there is no pollution except when the rainfall is unusually heavy.

This pollution had obviously a limited effect upon the quality of the river until the turn of the century and the effect on the natural movement of fish was not seen until much later because of the small population of the City in relation to the carrying capacity of the river. Nevertheless this basic type of sewerage system inevitably led to the present situation.

In London the pollution carrying capacity of the Thames was relied on until the 1850's. However, due to the Great Exhibition of 1851 being badly affected by the smell from pollution from the Serpentine which was then an open collecting sewer which flowed into the Thames and also Parliament being likewise affected, the basic problem there was tackled. In 1868 the sewers running into the river were cut off by a large collecting sewer which took all foul sewage down the river to specially built sewerage stations. This engineering feat still provides the basis of the present London system and anti-pollution action in the last 15 years has mainly centred on the ultimate treatment system at the sewage stations down river. A century later Belfast has not reached this basic stage of development.

CHAPTER 2 : INVESTIGATIONS BY WORKING PARTY

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CHAPTER 2 : INVESTIGATIONS BY WORKING PARTY

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### 2.3 Water Quality Investigations

The distance from Stranmillis Weir to the Queen's Bridge is approximately 2½ miles and in this part of the river which flows through Central Belfast the DOE has stated that there are 20 outfalls. (See Table III and Map II).

In reply to correspondence from this Committee the DOE related their numbering of outfalls in the table to the numbering on Map II which shows outfalls actually identified by this Working Party. However, the nomenclature on the map does not agree with the actual geographical locations.

The map does not show the remaining outfall points listed by the DOE since these were not positively identified by this Working Party. On behalf of the Working Party sampling was undertaken at points A-N inclusive (chemical) and I-II inclusive (biological) as indicated on Map III.

The sampling was of river water, river bed sludge and floating sludge. The analysis undertaken related to the 5 sampling categories of conditions, and the results appear in Table IV.

#### Group I:

Samples A to C (see Table IV A) taken two days after heavy rainfall ending the drought of Summer 1976 at low tide with water beneath McConnell Weir (13 September 1976)  
The river before this date had an extremely low flow level but at the time of sampling had a high content of surface rain water. Sample A was taken as typical of the river for 400 metres seaward of the point. Excrement was floating extensively over all of this area and raw sewage was observed. Sample B is typical of floating black sludge which peels off the bottom and floats to the surface. Sample C shows clearly the contents of overflow from a pumping station - again its contents are unmistakably floating excrement and toilet paper. A large expanse of "papier maché" can be seen on the sludge at this point at low tide.

#### Group II:

Samples D to I taken after one week of no appreciable rainfall at normal level when tide beginning to flow in over the McConnell Weir (12 November 1976). In this case there was thus a full twelve hours for the stretch above the Weir to collect outfall and overflow polluting material but it must be noted that this twelve hours would have been during night-time when it is known that the pollution from outfalls is less. Much worse results could be anticipated after a period of similar conditions in day-time.

Samples D to F (see Table IV B) are of sludge taken from the bottom at points near the river bank - all are septic and in the words of the Analyst gave off hydrogen sulphide which de-oxygenates the water. Sample F has the highest organic matter having had the "benefit" of the concentration of the filth building up behind the McConnell Weir at low tide.

Sample G is a water sample taken in mid-river about the same point (with the benefit of sea water already flowing into it) which is reflected in the analysis and through samples H to I, going up-river, it can be seen that the comparatively cleanest sample in terms of solids content and biological oxygen demand is that beneath Stranmillis Weir which by sea-ward flow both at high and low water is not contaminated with the outfalls of the City stretch (see Table IV C and IV D).

Group V:

Samples numbered 5 to 11 (see Table IV E) - conditions were those of no appreciable rainfall for ten days and the tide was out (30 May 1978). The lowering of water quality from the previous high tide group is abundantly clear and if samples 4 and 8, both being taken mid-river at Botanic Gardens outfall are compared, the content of faecal coli in the dry weather sample is more than three times that of wet weather, which would tend to refute the claim that the outfalls operate only in conditions of 9 times the dry weather flow content of the drainage system.

It is appreciated that for a complete picture of the pollution, as bacteriologically analysed, sampling would have to be taken also at times of heavy rainfall. However, in view of the fact that this has been observed (without actual sampling) to ameliorate the situation temporarily (especially in winter) the Working Party consider that samples were taken on the "good" side and should give a fair picture of the theoretically best situation! Nevertheless, as can be seen from the biological analyses in Table IV the findings of the samples can only be described as appalling.

It can be clearly seen that certain basic and indisputable facts emerge from observations made during the sampling and analysis undertaken and these are as follows:-

- (i) The river is heavily polluted by untreated sewage and uncontrolled industrial pollution. The sources of this pollution include pollutant from above Stranmillis Weir where, for example,



THE HISTORY OF THE UNITED STATES

The first part of the book deals with the early years of the nation, from the time of the first settlers to the end of the Revolutionary War. It covers the period of the early colonial period, the struggle for independence, and the formation of the new government.

The second part of the book deals with the period of the early republic, from the end of the Revolutionary War to the beginning of the Civil War. It covers the period of the early republic, the struggle for a stronger central government, and the expansion of the nation.

The third part of the book deals with the period of the Civil War and Reconstruction, from the beginning of the Civil War to the end of Reconstruction. It covers the period of the Civil War, the Reconstruction era, and the struggle for civil rights.

Group III:

Samples J. to N taken after one week of no appreciable rainfall at one hour before full tide with water above the McConnell Weir (11th January 1977). This is the only category of samples taken at full tide and in mid-winter with the natural comparative cleansing affect of tide and season and includes samples taken seaward of the McConnell Weir. The analysis was bacteriological. However, even in these conditions there was noticeable improvement in the mid-river sample J, taken seaward at Albert Bridge, from the badly polluted level of sample G, taken just above the McConnell Weir.

Sample K was taken at an outflow pipe behind a dyeworks behind Ballarat Street. The chemical content of this discharge is clearly seen - the colour is yellow but almost any colour can be observed at different times! Sample L however, does show a cleaner result although taken at a point which at low tide is possibly the most polluted general water area. The slightly beneficial effect of the only slightly less dirty water from the Harbour and Lough is evident. Sample M although taken at the notorious Botanic Gardens outfall, again shows an improvement in free flow high tide conditions; without the obstruction of the McConnell Weir.

Group IV:

These samples numbered 1-4 were taken after heavy rainfall with the tide out (6th October 1977). As with group 5 these samples were bacteriologically analysed. Group 4 should show the river at its cleanest due to the heavy rainfall, but the analysis showing the coliform and faecal coli content is so high that the likelihood of a worse reading in dry weather conditions with the tide out must be appreciated.

open pollution can be observed discharging from Belvoir Sewage Station and also from the harbour where extensive oil pollution is pushed up-river at high tide.

- (ii) Fish life in the urban river is not possible although it does exist in the Urban Thames in which the tidal river is 20 miles long as opposed to the equivalent Lagan stretch which is 3 miles in length. These facts alone show an astonishing level of Lagan pollution in that the foulest sections of the industrial Rhine and Seine both also support fish life, many miles from the sea.
- (iii) Overflow pollution appears to occur all of the time and this negates the objective of the system as originally designed, which was to discharge into the river only during heavy rainfall. Due to overloading this pollution is worst in dry weather.
- (iv) The recommended EEC maximum level of content of faecal coliforms is 2000 per 100 ml in waters used for swimming. The Lagan by these biological samples, not taken in drought conditions, at its best, is 17,000 to 180,000 - even at its lowest reading at least 8 times above the permitted level for swimming according to EEC standards. Allowing for water twice as dirty as the EEC level for swimming, there is still a considerable difference between that figure and the "best" reading from the River Lagan.

It is evident from the above facts that since conditions have not changed since the dates of sampling, there is not only a danger to health of the river users by contact but also to the inhabitants of the areas of the city which are frequently flooded by similar waters (the Connswater). The suggestion to the contrary by the DOE when they stated in correspondence with this Working Party that they had no evidence of a danger to health, ignores these facts.

## 2.4 Legal Responsibilities Concerning River Lagan

As indicated in Chapter 1.1.4 various efforts were made and works executed to create a proper drainage and sewerage system during the 19th century. These steps were implemented by the following legislation as now detailed:-

### 2.4.1. 19th Century Legislation

#### Belfast Improvement Act 1845

By this Act all existing sewers were vested in the City Council (Section 12) and the City Council was given the necessary powers to construct common (public) sewers (Section 90). An interesting environmental aspect of this Act is that it made illegal the throwing or causing anything to fall into any sewer pipe or drain (Section 168). This is the first actual anti-pollution legislation governing the City of Belfast.

A further strengthening of the anti-pollution objective is contained in the Belfast Improvement Act of 1850 which although again concerned with extending the powers of the Council to make sewers and to drain into any public water course, did have a limitation of this power in mind by prohibiting discharge into the docks of the Belfast Harbour Commissioners - a concept which is reflected in the Belfast Main Drainage Act of 1887. This Act formed the legislative basis of the system of drainage and sewage disposal as we know it today - that is the entire integrated joint system. However, one of the main objectives was also "the purification of the River Lagan and for construction of works in connection therewith" (Preamble to Part II). To this end Section 20 prohibits discharge from the newly constructed overflow outfalls which were part of the new system aimed at preventing continuous direct discharge into the river outside the period "between the commencement of ebb tide and three minutes after ebb tide" (Section 20). The aim here was clearly to use the tide to dispose of any polluting discharge and to prevent the continuous pollution situation (which exists almost 100 years later!). The section provides for the outfalls to pollute by the provision that

"this enactment shall not prevent the Corporation after and in time of heavy rains from permitting water which may contain sewage matter to be discharged by means of any stream outfall or overflow".

The findings of this Working Party show that the DOE is in breach of the "discharge" provisions of both the Acts of 1850 and 1887. A further irony of this situation is that although that legislation was not purely environmental, the Water Act of 1972 which is purely environmental gives the DOE power to "repeal, amend or adapt" this legislation "as it considers appropriate" (Section

28 (i)). This provision can hardly be regarded as progress although it is not known if the DOE has yet considered it necessary to exercise this power.

The former Belfast Corporation responsibility for the sewers of the City including the so-called "storm water" outfalls as detailed above was in 1973 transferred under the reorganisation of Local Government to the newly constituted DOE (Water and Sewerage Services (N.I.) Order 1973).

However, although this reorganisation was analogous to a similar reorganisation in Great Britain, a vital difference was that in Great Britain, Water Authorities, Conservancies, etc., were legally and administratively more highly developed (e.g. the Thames Conservancy, now the Thames Water Authority) and in existence for many years long before any special legislation such as Planning Law and Anti-Pollution Law was ever enacted. Accordingly, the legislation in Great Britain was designed to develop these institutions as separate bodies to govern rivers. Thus the DOE in Great Britain was not landed "lock, stock and barrel" with all of the direct responsibility for all sewers, drainage, etc., and also the direct responsibility for pollution control. Although overriding responsibility for these matters in Great Britain lies with the DOE, the Water Authorities there have a defined role to play in these matters.

The principle of "separation" of function of water supply and pollution control for Northern Ireland is a point to be considered but although in Great Britain some Water Authorities combine these functions such as the Thames Water Authority, the practical reasons for its anti-pollution success could be said to be because of the following factors:-

- (a) Inheriting a highly developed water supply and conservancy and anti-pollution system and
- (b) Being responsible for re-cycling water as a main source of supply and with few other sources than artesian supply, the Authority is compelled by circumstances to take a "hard-line" on pollution and certainly not be polluters themselves.

The various Water Authorities in England (although reorganised) thus retained their existing anti-pollution powers and administration and the well used apparatus of enforcing these powers and these powers were not combined in the overriding authority and responsibility of the DOE. By a further irony the Water Act (N.I.) 1972 exacerbated the situation in Northern Ireland by applying British Legislation by and large in accordance with the usual step by step legislative policy. The point arising here is, of course, the fact that in

Great Britain Water Authorities enforce the law in relation to the rivers in their charge against all offenders. Also, in Great Britain sewerage maintenance and construction is still carried out in several areas on an agency basis by the Local Authorities as agents of the area Water Authority(5).

The three bodies with direct and mandatory responsibility for the City Lagan being the Belfast City Council, the Belfast Harbour Commissioners and the Department of the Environment, it was decided to compile written queries for these bodies so that the major responsibilities could initially be traced and then identified and attributed to each body.

The facts emerging from these investigations are as follows:-

#### 2.4.2 Belfast City Council

The remaining responsibility of the Council subsequent to reorganisation of Local Government in 1973 is governed by the Belfast Corporation Act of 1924 which inter alia gave the Belfast Corporation power to construct the McConnell Lock and Weir in order to maintain a minimum higher level of water at all tides above the Gas Works together with various attendant works. The Act did not give the Corporation any right or interest in the bed of the river (Section 2) - but detailed below are the responsibilities of the Corporation and their successors the Belfast City Council under this Act. The relevant sections of the Act with regard to the river are as follows:-

#### Section 15:

The Corporation is required to maintain the locks and weir and other ancillary works "in good order and condition at all times so as not to interfere with, impede or obstruct the navigation of the River Lagan and shall restore and renew same when necessary". This is a clear statement of responsibility but the present situation is that navigation through the lock is impossible. The lock and sluice no longer function due to the decay of fixtures and machinery and silting. Indeed the sluice is partly jammed up with the result that at times of light rainfall the water level above the weir at low tide is one foot lower than the weir itself - a danger to navigation for all craft on the upper river due to the shallow water.

An interesting part of this section of the Act is that if any damage to any of these works is due to the negligence or default of the Belfast Harbour Commissioners then it is provided that they should reimburse the City Council for the cost of repair. This is important because of the responsibility of the Commissioners to operate the lock and sluice. This could mean that damage due to negligence in not even protecting against vandalism could land the financial responsibility, at least partly, on the Belfast Harbour Commissioners.

Section 12(d):

This is a minor part of the Act but it could be vitally important in defining the depth to which the area around the lock should, by law, be required to be dredged. This section states that on completion of the works the level of the bottom of the lock and bed of the channel to the lock should not deviate more than one foot up or down from levels shown on plans deposited.

The sluice at the McConnell Lock has been opened several times in recent years for various reasons. The opening of the sluice which leaves a stinking and unsightly expanse of mud banks right up to Stranmillis at low tide was to carry out repairs to the works under the 1924 Act.

Within the last three years the City Council has excavated the sludge banks of the river on the County Antrim side between the Ormeau Bridge and Lavinia Street as part of the "cosmetic" operation carried out as agents of the DOE which only removed the sludge appearing above water level at low tide along that stretch of river. This operation was welcome but the remaining sludge banks to even 40 feet from the banks are, in parts, only six inches beneath water level at low tide due to the method of carrying out this work.

The City Council in reply to queries did not give any reason why this section of river was selected for this treatment (since there are other, even more badly silted up stretches in the upper section of the river towards Stranmillis Weir). It is not known that the Harbour Commissioners had any part in this operation in spite of the obligation imposed on them by Section 16 of the Act as detailed below.

### Section 13

By this section the Corporation was given the power to regulate the water flow in the river and the "said weir" (presumably meaning the sluice in the weir) but in such a way as not to interfere unreasonably with the passage of vessels up and down the River Lagan. Although thankful for any remedial action already carried out by the City Council on an agency basis, this Working Party regrets the apparent random selection of the site of operations without any consultation with those who know and use the river and other amenity interests.

#### 2.4.3 Belfast Harbour Commissioners

The responsibility of the Belfast Harbour Commissioners in relation to the river and works created thereon are as follows:-

#### Belfast Harbour Acts 1847-1957

In the Act of 1831 the "Harbour Corporation" was given power to create the main Harbour Channel and under the Act of 1847 which superceded the 1831 Act, the limits of the territorial jurisdiction of the then newly constituted Harbour Commissioners were defined as being between Grey Point in Belfast Lough to Stranmillis Weir.

#### Section 18 Belfast Corporation Act 1924

The Harbour Commissioners are given the obligation to operate the lock and the power to open and close the lock to prevent the flow of water and passage of vessels (Section 18 (a)). The meaning of this sub-section is not entirely clear, but presumably is endeavouring to state that to operate the lock the Commissioners must obviously have the power to obstruct the water and passage of vessels through the lock. Further, by Section 18 (b) the Commissioners are given the power to impose a scale of charges with the consent of the Department of Commerce. This scale was last propogated some nine years ago but the obligation under Section 19 to publicly post the scale of charges is not and has not for some years been complied with.

#### Section 17

By Section 17 the Commissioners may require the Corporation to open the sluice and drain the river above the weir for repairs "or other



reasonable purposes". It would seem that the Commissioners see no necessity to exercise the right although repairs are urgently required.

#### Section 16

However, the most important obligation upon the Commissioners is under Section 16(2) where they are required to maintain between the weir and Stranmillis Lock the "present navigable channel" or an "equivalent navigable channel in said river to a sufficient depth to allow the passage as at present of vessels of a similar class, dimensions and draft to those now using the river". It is understood from correspondence that the view of the Commissioners over the years in relation to this obligation is that because commercial navigation ceased in 1958 the obligation to dredge no longer exists and also that the depth of dredging required is only for that type of navigation (presumably barges). This view as far as the Working Party is aware has never been challenged but it can be seen from the plain words of the Act that this view is unsupported by the section in that reference to the vessels using the channel at the time of the Act is simply a definition of depth and is not qualifying the obligation under this section by making it dependent on the use - commercial or otherwise - of the river by barges.

The Commissioners concede they have the obligation to operate the lock but with the qualification that "the lock is no longer operable". This of course is no escape from their obligation under the Act to require the City Council to make it operable. Indeed a formal request to open at certain times is thought to be the first stage in crystallising this responsibility. It should also be stated that since the commencement of the disturbances in Northern Ireland in 1969 the Commissioners have sought to restrict any movement on the river up to Stranmillis Weir. This restriction is that without their permission no vessels may go below the weir towards the harbour and there is to be no boating activity after dark. This restriction can seriously affect the rowing interests although permission is usually given. However, the major obligations under the Act affecting the future of the whole river are being overlooked and the law is therefore being ignored by a body responsible for the carrying out of important statutory obligations.

This is a fine example of a responsible body adopting the attitude of having power without responsibility.

#### 2.4.4 The Department of the Environment (DOE)

The responsibilities dealt with above relate to the obligations of dredging of the river with a navigable channel as defined in the 1924 Belfast Corporation Act. This depth would be more than an adequate standard by today's chronic situation if one could assume a fair depth to be 2 metres for 20 feet from all banks at low tide. These responsibilities also relate to properly operating the McConnell Lock and Weir and sluice, but the main statutory obligations in relation to the river rest with the DOE under the Fisheries Act (N.I.) 1966 and the Water Act (N.I.) 1972. The effect of the other local legislation referred to in the introduction to this Chapter is in effect nullified in the Water Act which gives the DOE power to nullify it at will.

Correspondence between the Working Party and the DOE established the following:-

- (a) The DOE acknowledged that it is the body responsible since Local Government reorganisation for the Belfast sewerage system (Water and Sewerage Services (N.I.) Order 1973).
- (b) There are some 20 outfalls (see Table III) between Stranmillis Weir and the Queen's Bridge which, by their names "storm relief" and "stormwater outfall" mean in the Lagan context that they pollute the river either part or all of the time with human and industrial sewage. This is an horrific number of highly polluting outfalls in a stretch of River less than 2½ miles long.
- (c) There are no treatment works whatever on this stretch of river to deal with the overflow effluent, or to treat the content of these outfalls in any way - this means that there is no attempt to even neutralise the harmful solids before a large proportion finds its way into the river.
- (d) There would not appear to be a method of calculating the flow levels in the joint system to establish whether the officially stated formula of overflow being 9 times dry weather flow is complied with. Despite official denials by the DOE this Working Party has evidence (see Table IV (a) to (e) which can be collected at any time from the river that human faeces are discharged into the river. Human excrement on the launching slips of the Boat Clubs is a common sight.

- (e) It seems that the Department regards its mandate under the Water Act 1972 as a general governmental direction and not a legal obligation. The Department also appears to hold the view that it has some sort of discretion with regard to prosecutions. This is not the correct position under Section 1(b) of the Act since the Department has no lawful discretion in the matter except where it has issued "consents" to pollute and must investigate, and where adequate evidence is obtained, must prosecute where evidence of breach of the law is before them. An example of this apparent attitude that action to enforce the law and to improve the water quality is discretionary is in another reply of the DOE where it is said that "the scale and pace of such measures are dictated to a great extent by Government priorities". This is akin to saying that the Police have such an inhibition placed upon them in connection with enforcement of the Road Traffic Act! The constitutional implications of this attitude are both far reaching and alarming.
- (f) The Department upon investigating any case in relation to know industrial pollution adopts the attitude of shepherding the offender and encouraging remedial action, but by not prosecuting in relation to this stretch of the river, there is no practical method of any "encouragement" in relation to industrial pollution. This Working Party holds the view that the only encouragement would be penalties in the form of fines under the Water Act which are designed to have this very effect since the fine is calculated on a daily basis of non-compliance with a court order subsequent to a successful prosecution. It is wrong not to enforce the law because of possible adverse effects on employment. Compliance with other legislation such as the Factories Acts is not seen in the same light and in the case of the river the environmental deprivation directly affects the local population.
- (g) Since Local Government reorganisation and the placing of the duty to take action in pollution matters on the DOE the Working Party finds little record of any action to "recapitulate" on non-compliance cases known at that time and to take legal proceedings, and also to take action in other cases which by virtue of the terms of the Water Act 1972 then became illegal. Consents in general under Sections 7 and 8 of the Water Act 1972 filed since reorganisation relate largely to planning applications which have been lodged for

private and public structures and the drainage and sewerage thereof. However, in relation to the Lagan it is known that in cases of the most serious pollution consents have been issued.

By this means the objective of the Act to stop water pollution can be evaded by an official making in effect a judicial decision under pressure from the "needs of Industry" taking precedence over public health and amenity (Section 2(i)).

The line of action which should be taken by the Department is clear. It is simply to prosecute until a stage of an acceptable water quality standard is reached.

The Working Party is of the opinion that machinery should be introduced by the DOE to:-

- comply with Section 1 of the Water Act and to promote the conservation and cleanliness of the waters of Northern Ireland.
- enable prosecution by the Department - only in rural areas where the Department inherited the previous machinery is there evidence of the Act being enforced. The position as related to pollution of fisheries was well stated in the Belfast Newsletter<sup>(6)</sup> which referred to those Civil Servants responsible for pollution control as "wrongly arrogating to themselves the rights of judge and jury on matters of life and death in Northern Ireland. This must stop. For whatever the situation was previously there can be no mistaking the mood of the country now, the people want the various Government Departments to do the jobs entrusted to them and leave judicial decisions to the Courts".
- put an Inspectorate out on the river and to police the situation instead of acting in a totally passive and "discretionary" capacity and then only when cajoled to do anything at all.
- establish the precise facts about the state of the Lagan.

The crux of the matter is that under the Water Act only the Department can prosecute in relation to pollution (Section 26). Perhaps this point was overlooked by the Government in 1972 and by those responsible for framing

the legislation enabling Government and Local Government reorganisation in 1973 when that reorganisation transferred responsibility for sewage outfalls to the Department. The Department appears to view the River Lagan in Belfast as an inherited problem in which remedial action can be deferred for other priority requirements of a much later origin - with the priority decided by themselves. The fact of this problem being inherited does not warrant this view.

The basic difference in relation to the role of the Department in Northern Ireland as contrasted with Great Britain is that in Great Britain, Water Authorities such as the Thames Water *Authority* take the responsibility for action to enforce the Water Act in accordance with the terms of that Act. This permits these *Authorities* and indeed enables them to create a full administrative policing and prosecuting system which can be used against any individual or body. Legislation originating in Great Britain has thus been applied without adaptation to the local legislative and constitutional framework in which it is supposed to operate.



### 3.1 An Overview

As has been pointed out in Chapter 1 (1.2.3) with the deterioration in the river, the only major sporting activity remaining is rowing and it should be stated that the level of use of the river compares favourably with the use of public playing fields (9 clubs with approximately 500 participating members on the river for 9 months of the year at an average of 3-6 times per week) and it is therefore all the more regrettable that it is common for human excreta to be smeared on togs and equipment, the steps and slipways to be covered with the same and detergents needed to dissolve oil pollution from the boat hulls.

Recreational enjoyment of the river is reduced by the Boulevard roads which have become noisy speed tracks and walking alongside the river could no longer be said to be a pleasant pastime. Except at flood times in the winter, the smell of the river is such as to deter all from going out on the river (save oarsmen in full training) or walking by the river. However, the unfortunate riverside residents have no escape from the foul odours.

### 3.2 Planning

Over a period of time various ideas have been mooted including:-

- (i) moving the weir to near the position of the Queen's Bridge to cover the mud banks exposed below the McConnell Weir at low tide;
- (ii) clearing either side of the river banks from the harbour to Stranmillis (including the Boulevard roads) and landscaping with amenity boating and recreational features;
- (iii) culverting and covering up this entire length of river;
- (iv) narrowing the river to a uniform width to increase flow such as would remove the silting problem.

In the opinion of this Working Party part of an ultimate solution could be found in (i) and (ii). There is little point in having high quality residential and amenity development such as the Short Strand (work commenced); the Markets (nearing completion); the Maysfield Leisure Centre (completed) and related Marina (planned) and the Cultural Centre (proposed at the north side of the Albert Bridge) being planning in relation to the river when the full enjoyment and usage thereof is prevented by the state of the river.



### 3.3 Investigations and Reports by Other Bodies

The visual state of the river and the offensive smell has caused individuals and members of local government to voice publicly that "something must be done". However, it was only with the formation of the Sports Council for Northern Ireland that a statement of the facts was given by the representatives of persons who actually had day-to-day contact with the river, when it was stated in a memorandum in January 1973 from the Sports Council that it was essential that "a Government Department or Agency is charged with the responsibility for restoration of this stretch of the river" and that "we suggest that the long term planning might be carried out under the auspices of the Lagan Valley Country Park Committee but that immediate work should be taken by Enterprise Ulster". This Committee is now giving its recommendations in relation to these suggestions.

In 1969 a Government Pollution Survey was undertaken of the upper river. However, although many individual investigations are listed in this Survey which was confined solely to industrial pollution, the quality of that investigation, its clarity of purpose and its end result (if any was intended) is illustrated by the following typical extract:-

"The nature of this firm's effluent is not really known to us, and the firm has been very reluctant to co-operate in these investigations. Several attempts were made to obtain the necessary information and particularly but Mr. \_\_\_\_\_, Chemist, was most evasive and stated emphatically that any such information could only be obtained by appointment with Mr. \_\_\_\_\_ at 10.30 a.m. on 3 February 1969 when it is hoped to obtain full details of their effluent, which I understand is of considerable volume and potency. There appear to be several discharge points into the Lagan believed to consist of wash water, bleach and dyes, at a rate of approximately 17,000 gallons per hour. This would appear to be one of the pollution black spots between Lisburn and Stranmillis. Effluents believed to consist of alkaline, scour liquor, spent dye liquor, spent bleach liquor, etc."

All that would have been necessary in this case would be to take the samples at the appropriate discharge points, prove their source by simple tests and prosecute.

Although this internal investigation took place before the passing of the Water Act 1972 one may be amazed to realise that prosecution under the Fisheries Act did not result from this example of gross continuing pollution.

In May 1976 a Paper "The River Lagan, Past, Present and Future" was presented on behalf of the DOE to the Institute of Water Pollution Control (7). This work dealt with the whole length of the river, but apart from giving indications from limited sampling of the state of the river from its source and including maps it did not illuminate the disastrous levels and nature of pollution on the tidal stretch. On the Connswater River which joins the river at the Harbour it is stated that:-

"pollution is caused essentially by sewage reaching the river by storm outflows from the heavily overloaded sewage system" (p.9)

It should be pointed out that the Connswater is only one tributary joining at the Harbour and hardly appreciably affecting the tidal river above it, and especially above the McConnell Weir. These words could equally apply to the City stretch of the Lagan.

In its conclusion the report states:-

"hopefully we have seen in the summer of 1975 the Lagan more polluted than we shall ever see it again. The summer was very dry and river flows exceedingly low. We would be unfortunate indeed were we to see such conditions again for a number of years".

The fact that this statement depended more on hope than science is illustrated by the fact that 1976 was just as dry and the pollution greater. Even more significant is that in 1977 even with more rain the pollution was equally as bad. The basic fact is ignored and that is that in dry weather the pollution is more concentrated due to the sewage overflow operating even in these conditions. An even more alarming remark is made in relation to proposed "solutions" when the author says that:-

"the proposal, which may help with both problems (Lough Neagh and the Lagan) is to direct sewage effluent from Lough Neagh to the Lagan, together with dilution water from the Lough as and when needed"

In other words this proposal refers to increasing the sewage carrying capacity of the Lagan by increasing the flow. This Working Party regards this suggestion as unacceptable since it would permanently ensure the pollution of the Lagan and its continued use as a means of disposing of the sewage of Belfast and other surrounding areas.

The Report classifies the City stretch of the river as "Class 3" - "river of poor quality requiring improvement as a matter of some urgency" and the only part classified as Class 4 - "grossly polluted river" is the Blackstaff River and the stretch between Youngs Bridge and Blaris in the upper river.

This Working Party contends that the water and bed at the City stretch of the river is grossly polluted. Sampling undertaken by the DOE on the stretch from Stranmillis Weir to the mouth of Belfast Lough, shows it as being the most polluted stretch of the whole river. Their readings were 40% and 42% dissolved oxygen at Ormeau and King's Bridges respectively in February at low water to the overall worse readings of 49% and 27% at the same points at low water in April. It should be noted that for salmon to survive or even make a run up a river the minimum dissolved oxygen requirement is 30%. The absence of salmon shows that much worse "patches" must exist at times and this contrast with the dissolved oxygen readings raises the question of whether these readings are typical and whether other polluting factors are affecting the situation. However, although the same survey shows the reading up-river at Stranmillis Weir as considerably better - 48% and 64% on the same inspection date, and although the river above Stranmillis Weir is always considerably cleaner, both of these stretches have the same classification of "Class 3" in the Report!

In recent months the Belfast Branch of Friends of the Earth has circulated pamphlets reviewing the state of inactivity of officialdom in dealing with the Lagan and its problems with emphasis on the general environmental moral responsibility and efforts are being made by this group to obtain and co-ordinate opinion to bring pressure upon the Government to act.(8)

The DOE Working Party Report was published in July 1978 and comment on that report is contained in the next chapter.

### 3.4 Comparisons with Other Areas

#### 3.4.1 Northern Ireland

Comparisons with other areas in the United Kingdom highlight the legal and practical problems of the Lagan. Even in other areas of Northern Ireland, where the Department of Agriculture Fisheries Division and the present Conservancy Board inherited a system of detection and prosecution, an administrative and legal framework exists so that pollution is actively monitored, and occasionally prosecutions are taken under the Fisheries Act of 1966 and/or the Water Act of 1972. However, the River Lagan never had a separate Conservancy or Fisheries Board - possibly because of the incorrect assumption that the Harbour Commissioners had total powers and responsibilities over this stretch. The Harbour Commissioners' powers however, do not relate to pollution or protection of fish life. In addition the Department of Agriculture Fisheries Branch are not known to ever have instituted any prosecutions regarding pollution in the City Lagan.

It is understood that the Fisheries Conservancy Board as agents of the DOE have been specifically excluded from operating in their usual role downstream of Stranmillis Weir.

It is the present administrative practice that the public health officers of the Belfast City Council are left to deal with public health matters within the boundaries of Belfast. The Public Health Acts under which the Public Health Inspectorate operates are not unnaturally primarily directed towards matters of public health in their usual form, i.e., food storage and preparation, housing, sewers and dumps, insofar as they directly affect housing and persons living in the area. However, although this legislation could be said in certain circumstances to overlap some of the provisions of the Water Act 1972 and the Fisheries Act 1966, the primary requirement for prosecution under the Public Health Acts is to be a "danger to public health" - not to fish life or the fact of pollution of a river "per se". It is however, perhaps surprising that raw sewage in a river used extensively by people has not resulted in action being taken by the Public Health Inspectorate under the Public Health Acts. However, when it is noted that the DOE does not concede that such a danger exists although it has overall responsibility then the inactivity of the Inspectorate can at least be partly understood.

The views of this Working Party on this particular point are stated in the recommendations of this Report.

### 3.4.2 Great Britain

It is in comparison with Great Britain that the deficiencies of the Northern Irish Administrative framework are most apparent.

It is surprising that most people in Belfast know more about what has happened to the River Thames in the past decade than their own River Lagan, but not surprising when one considers the attention given to the problems of the Thames and attendant publicity over a period of years. Other river areas of England are in a less advanced stage of progress against similar pollution problems, notably the Tyne and the Mersey. It is not the intention of this Committee to relate in detail the basic facts and the progress made in these areas, about which considerable material is available. Instead only contrasting points where the circumstances are relevant to the Lagan are highlighted below.

These points are as follows:-

#### (a) Administrative Comparison

With most major river systems in Great Britain the Water Authorities are separate from the DOE and other direct agencies of Government. These Water Authorities e.g. the Thames Water Authority and the Northumbrian Water Authority (9) in the North are sufficiently autonomous to independently take action against polluters and their priorities (especially on the Thames) have been rather more in favour of the public as the "offended parties" rather than the offender, be that an individual, a public or private body or even an agency of the Government.

On the Tyne a joint committee was formed to deal with the clean-up programme which both included Government Agencies e.g., Planning Authorities, Ministry of Housing and Local Government and the Tyne Improvement Commission. The Northumbrian Water Authority did not lose its autonomy in the setting up of this committee to deal with a problem which is much more complex than that of the River Lagan due to it involving many highly industrialised areas spread out over a large water catchment area starting a long distance from the sea.

From the literature on the Tyne it is clear that this independent and committed Joint Committee has ensured that reports both technical and non-technical were researched and used under its auspices. These reports were acted upon and, most important of all, approval not given to industrial and public and domestic development which conflicted with the policy of the Joint Committee.

Prior to Government reorganisation in Northern Ireland and despite arguments to the contrary it was decided that the Government Department then made responsible for all sewage systems would be best qualified to deal with the pollution problem!

The Working Party cannot accept the argument that Northern Ireland is too small to have both a Department of the Environment and Water Authorities. It is not a valid argument as no institution of any size could function with such inherent conflicts of interest.

(b) Legal Framework

In the past local lawyers were frequently instructed by the local Fishery Boards to take anti-pollution prosecutions under the Fisheries Acts in the Magistrates Courts but since centralisation of prosecution functions in the Fisheries Conservancy Board under the Fisheries Act (Northern Ireland) 1966, the number of these prosecutions has diminished considerably. The reason for this appears to be the conflict of interest factor and also the assumption that all prosecutions are really aimed at the protection of Fisheries - a false assumption in view of the aims and scope of the Water Act 1972 which covers all pollution and not only that which is a danger to fish life. This assumption is still evident in the fact that anti-pollution activities of Government such as they are, are dealt with by the Fisheries Branch of the Department of Agriculture and the Fisheries Conservancy Board as agents for the DOE.

Action under the 1972 Act can only be taken by the DOE and presumably only upon information to support a complaint being put before the Office of the Director of Public Prosecutions. However, in view of the fact that the DOE is responsible for much of the Lagan pollution, the DOE is put in an invidious position and this Working Party is of the opinion that the existence of an independent water authority would ease this situation and enable the establishment of a framework to facilitate prosecutions in the following way:-

- (i) receive the complaint - be the recipients the Police or the DOE;
- (ii) to acknowledge the absolute obligation to act (as in the case of the Police in other public criminal legislation); and
- (iii) to convey the reporting and evidence found on investigation of the complaint to the Director of Public Prosecutions in order to actively promote prosecutions under the powers contained in the Water Act (N.I.) 1972.

CHAPTER 4 : DEPARTMENT OF ENVIRONMENT WORKING PARTY  
REPORT ON RIVER LAGAN<sup>(10)</sup> - A COMMENT

- 4.1 Meeting with the Department of Environment Working Party
- 4.2 Department of Environment River Lagan Report
- 4.3 Detailed Proposals of the DOE Working Party
- 4.4 A Water Authority
- 4.5 Conclusions of the DOE Working Party and Comment Thereon



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#### 4.1 Meeting with the Department of Environment Working Party

Some months after this Working Party was formed it became known that on the 17 February 1976 the Permanent Secretary of the Department of the Environment had set up a Working Party on the River Lagan with the following terms of reference:-

"To consider proposals for the improvement of the River Lagan between Stranmillis Lock and the Queen's Bridge, including banks and other adjacent land and to make recommendations with particular reference to:-

- (a) the future planning of the area including the carrying out of public works;
- (b) the cost and employment effects of proposals involving public expenditure in relation to the benefits to be derived, and the contributions (if any) to be made by authorities or bodies outside Government;
- (c) the Department or authorities which are or should be responsible for the execution of public works and the order or priority in their implementation;
- (d) any legislation action that may be necessary or desirable".

After preliminary correspondence a deputation from this Committee met the full Government Working Party on 14 December 1976. It was with regret that this Working Party formed the opinion that preconceived ideas had already been formulated about the problems in relation to the river. We further regret that the DOE did not appear to have a detailed knowledge of the nature of the problem as indicated from the terms of reference above. It was admitted that no member of that "Working Party" had actually been onto the river or checked personally the actual and visible sources of pollution on the spot.

Representation on the Government Party by persons with practical knowledge of the river was refused with the statement that such representation would not be necessary due to remedial plans (then undefined) being already "far advanced". That was in December 1976. Their Report came out in July 1978.

After this meeting further correspondence ensued but no proper and forthright information in relation to the activities of the Working Party and its remedial plans were forthcoming despite several requests. Indeed, the views of this Working Party on remedial action were

given in writing as requested but the only response was a reference to the imminent Government report. Correspondence with the Minister also only produced a reference to the impending Government report.

#### 4.2 Department of Environment River Lagan Report

This not insignificant Report was published in Summer 1978. This Report is severely disappointing in the following aspects:-

- (a) whilst admitting the necessity of a large scale programme it rules it out as impractical without offering any supporting evidence;
- (b) many of the proposals it makes are unsound;
- (c) the pollution problem and its attendant health hazards are not properly considered;
- (d) the lack of serious consideration of a water authority - the need for which is further proven by the dearth of research and consequent quality of recommendations in their Report.

Each of these points are now examined in more detail and possible explanations suggested for the unacceptable conclusions of the Bloomfield Working Party.

In 1969 the Belfast Urban Area Plan (11) was published by a team of consultants engaged by the Northern Ireland Government. In this Plan it was proposed that:-

"The Lagan should be developed as a feature of general interest and that its considerable recreation and amenity potential should be developed" (2.21)

It further proposed "a Regional Leisure Centre which would utilize the recreation potential of the river" (2.21)

A decade later what progress has occurred?

The DOE Working Party states in their Report that the present situation is as follows:-

"the unsightly accumulation of mud and silt..... convey a strong impression of neglect" (3.04)

and

"the mud also places considerable constraints on the use of the river for recreation (3.05).

and again

"the combination of pollutants mud and rubbish has destroyed any possibility of the river being used for swimming or angling in present conditions" (3.10)

Given these facts the Report frankly admits that:-

"an ambitious and farsighted scheme of reconstruction and amenity works is needed" (5.01)

However, right at the beginning of the DOE Report it rules out such a scheme and advocates:-

"initiatives of a modest and practicable nature" (1.06)

"works of a relatively minor and remedial nature which could be carried out within reasonable limits of expenditure" (4.01)

"a practicable and realistic programme of short-term environmental improvement and amenity works" (4.03)

ruling out the necessary scheme on the grounds that:-

"implementation of the works would involve expenditure on a scale difficult to contemplate at the present" (4.01)

"practical realities presently preclude investment on the scale required to reduce the problem to what by common consensus would be a completely acceptable level" (7.25)

The DOE Working Party recognises that:-

"small-scale work of this cosmetic type alone is clearly not sufficient to make a really significant impact on the river environment downstream of Ormeau Bridge" (3.07)

"it is questionable if these measures would have a really lasting impact. It would seem that this could be achieved through a radical rehabilitation scheme" (3.17)

"such short-term improvements in the system will undoubtedly enhance the water quality in the tidal section of the river to some considerable extent. It should be appreciated however, that a reduction of the pollution caused by sewage and industrial effluents in the urban stretch of the river will not necessarily enable the river to sustain fish life and make it suitable for swimming" (3.13)

However, having admitted that a small-scale programme is of little value they go on to recommend it without seriously considering the necessary full-scale programme. Nowhere are the reasons given for this cursory dismissal of the benefits to be gained from a full-scale programme. There is a mention of

"a study of the potential of the river and adjoining land for amenity and recreational development"

but the results are not given. If the benefits have been calculated the results should be given, if they have not, then there is no basis for the Working Party's recommendations.

Unlike other goods which have substitutes, a natural resource like the Lagan is an irreplaceable and unique asset of increasing value - but this value cannot be actualised if it is going to be continued to be used as an open sewer or in the words of the Environment Minister

"retaining its essential characteristic as an industrial watercourse"(12)

or only have a cosmetic clean-up performed as recommended by the DOE Working Party. By the standards of other City rivers it is not correct to say that the City stretch of the river is an industrial watercourse - where is the industrial water traffic or the industrial river water consumption? Both on the grounds of the need for accessible facilities to cater for increasing leisure time and as one of the few environmental assets available to the deprived inner city residents, the Lagan must be returned to a state suitable for all activities especially such popular water sports as fishing and swimming.

The lack of resources for a full-scale programme cannot be pleaded by the DOE Working Party for this is a time of record unemployment in the construction industry.

#### 4.3 Detailed Proposals of the DOE Working Party

##### 4.3.1 Narrowing of River

The DOE Working Party stated their primary objective as follows:-

"The pre-requisite of a major Lagan improvement scheme in the mind of the Working Party is open land which could be developed for amenity purposes on each side of the river channel" (5.05).

This is indeed a desirable objective and one would have hoped that the recommendations of the Belfast Urban Area Plan would have been taken up.

That Area Plan stated that:-

"The need for any traffic routes bordering the river must be questioned as they seriously limit the amenity value of the river"

and again

"The embankment road severs Ormeau Park from the river and ideally should be re-routed to allow the park to sweep down to the river".

However, nowhere are these recommendations even mentioned let alone considered in the DOE Report.

In fact the opposite is happening. Amenity use of the river is being further discouraged by the expansion of the road network beside and over the river. (See next section).

Instead of improvement, the DOE Working Party for the Improvement of the River Lagan recommends that a substantial part be filled in - the river channel partly above but totally downstream of McConnell Weir to the Queen's Bridge to be reduced to 50 metres! (5.07)

It is proposed that the method of providing linear walks alongside the river where at present buildings come right to the river bank will be to infill and plant trees to hide such existing and rather unsightly development. Since such stretches of buildings are at the narrowest sections beneath the McConnell Weir infilling would have an even more disastrous affect on river amenity for scenic and boating purposes.

Further, the intended new banks are to be vertical when they should be sloped to minimise the effect of wash from powered craft. Again it is clear that the DOE has

not consulted boating interests and is ignorant of this basic design feature when its report states that the choice of type of banks "is largely one of aesthetics" (5.23)

Narrowing where there is existing building to the edge of the river and at other places on a larger scale is a recommendation which would effectively prevent the return of sailing and boating from the Maysfield Leisure Centre. It would also increase the potential for conflict of interests between e.g. angling and boating.

Whilst other cities spend immense sums of money creating lakes the proposals of the DOE Working Party will destroy this national asset. Their recommendation reminds one of the notorious statement by a US General during the Vietnam War "In order to save the village we had to destroy it".

However, it is admitted that

"In practice whether or not this would be the case could not be confirmed without detailed hydraulic investigation or the benefit of experience" (5.09)

Lack of knowledge however seems to be no barrier to a recommendation.

It is in fact essential that this large-scale infilling does not happen. Small-scale infilling could be advantageous to river amenity where linear walkways and planting can thus be created in areas of the river that are least required for amenity purposes. Such works are indicated in Map VI.

To date action directly involving the river has been dumping a few loads of soil without proper hardcore screening in the abandoned lock at Stranmillis and leaving it partly filled in and removing flagstones adjacent to the lock, so leaving the surface in a dangerous condition.

On the Annadale side similar dumping has taken place on the strip of land beside the river but no attempt was made to firstly remove dumped motor cars at the river bank.

So much for work scheduled to be completed in 1978 (4.10)

#### 4.3.2 Road Development

Without a body to protect the river from the DOE which views the river and adjoining land as un developed road then more and more roads and car parks will be built alongside and over the river.

One example has already been given in the previous section where the recommendation of the Belfast Urban Plan (to re-route the road that divides the Ormeau Park from the river) has been ignored. Other examples are as follows:-

##### Road from Ormeau Embankment to East End of Albert Bridge - Planned Road Numbered (E20)

"The existing road plan for Belfast contains a proposal for a cross-river road linking the Ormeau Road with the Short Strand/Albert Bridge junction which would run through the site and then for much of its length roughly on a line alongside the river" (4.08)

In planning for open space along the river the DOE do not consider criticising this proposal but instead accommodate it by suggesting that the land for the riverside walk be taken from the river by infilling it. Further, in the official presentation given by the DOE to the Belfast City Council it was stated that the above road's existence was not known when the Working Party report was being written! It was also stated that the road could provide "an opportunity (sic) for narrowing the river".

Since in nearly all redevelopment schemes vesting of properties is involved, no valid reason can be seen for not using vesting procedure to create linear parks and walks which would not take from the river amenity. Indeed since the DOE clearly intends to vest property in the Ballarat Street area for the purpose of the E20 road link (4.08) it cannot be understood why linear parks cannot be created by the same method. In the proposals of this Working Party infilling is only adopted in conjunction with vesting to provide reasonable contours at irregular points and to enable continuous linear walkways under existing bridges (railway bridge and Albert Bridge).

##### Annadale Junction

Using the river and adjoining amenity lands (Botanic Gardens and open space beside Sunnyside Street) there are DOE plans for a large scale junction/roundabout near the King's Bridge.



Work has already started on the Annadale Embankment (beside Governor's Bridge) as part of this scheme which includes a link-up with a road through a Bird Sanctuary in Belvoir Park (part of the Lagan Valley Country Park!) to finally join with the outer ring road. Nowhere are these plans mentioned in the DOE Report.

#### Lagan Bank Car Park

To the west of Queen's Bridge there is a linear piece of land which would serve as a fine start to the riverside walk and which is depicted in the DOE Report (Sketch 7) as such.

At present it is given over by the Environment Department for use as a car park.

In mid-1978 work began to extend and beautify one end near the Queen's Bridge. Those who thought that this heralded the start of a park for people were disappointed - if not surprised - when it in fact resulted in an extension to the car park.

#### Stranmillis College Car Park

On a sloping piece of land overlooking the Lagan at the junction of Stranmillis Road and the Embankment unsightly pre-fabs were cleared from the land during the 1960's. An opportunity for the Environment Department to provide open space and park? - NO! - once more grass has been replaced by asphalt and a car park constituted.

A potential problem is the planned new bridge for the re-planned ring-road which is apparently to cross the river near the Gasworks. Unless this bridge is of sufficiently high level, sailing activity could be completely spoiled - however, unfortunately, typically of "Lagan related" works, there has been no consultation whatever on this point with the Sports Council, NICPR or any other interested body. With the existence of a River *Authority* such consultation would be essential (See 5.1)

#### 4.3.3 Water Level Control Structures

The DOE Working Party considered two types of water control structure, (i) a barrage and (ii) a weir.

##### Barrage

The DOE Working Party initially favoured a barrage but then rejected it solely on the grounds of it requiring "continuous attention to ensure that the gates were suitably adjusted" (5.13). Amenity use was given no consideration.

## Weir

The report recommends the location of the proposed new weir on two sites below the Queen Elizabeth Bridge. This Working Party regards both of these as sensible locations. However, once again ignorance of river uses is apparent from the type of construction illustrated which has a walkway and buttresses which would preclude craft of any description going over the weir at high tide - thus stopping the only current sporting events left on the river being Head of the River long distance races. Lack of any consultation with the sporting authorities is highlighted by this recommendation.

### 4.3.4 Removal of Mud Banks

"it is clear that the question of the mud banks will feature largely in any major Lagan improvement scheme, both from the point of view of upgrading the environment and of restoring the river's water recreational potential.

It is equally clear that the construction of a barrage or weir to raise and control of the water level or a dredging operation to remove the mud banks or to reduce them to an acceptable level would involve work of such proportions as to place it outside the limits of what is feasible in the short-term" (3.06) (underlining added).

These paragraphs contain a complete non-sequitur - it is definitely not "equally clear" why removal of mud banks could not be carried out in the short-term - this sentence is just an assertion without supporting evidence.

DOE plans for physical structures on the Lagan and adjacent lands are summarised in Map V.

### 4.3.5 Sources and Extent of Pollution

This section is the least satisfactory of all the sections in the Report.

The Report admits that:-

"dissolved oxygen concentrations in the river downstream of Stranmillis are too low to sustain fish life; the bottom muds are anaerobic and contain no life forms" (3.11)

It goes on to admit that:-

"It is considered that sewage, agricultural practices, some industries and vegetation in

the catchment all contribute to this problem. While the relative importance of these courses is not yet known the fact that the river flows through a major city and that other large towns are situated in the catchment suggests that domestic sewage must contribute a significant proportion".(3.11)

However, elsewhere it claims

"the nature and extent of the Lagan pollution problem are fully appreciated" (7.25)

The Report states that

"the installation of new effluent treatment plants by a number of industries discharging into the river upstream have led to a decrease in the overall pollution load over the past few years. The effect on the water quality of the urban stretch of the river, however, has only been marginal" (3.10)

yet no explanation is offered why this should be the case. The fact is that the responsible Department has not given any explanation of why this should be the case. For example, it is admitted that the system is over-loaded and a statement is made that

"a number of storm overflows discharges polluting material to the urban water courses or directly to the Lagan whenever the sewerage system is overloaded by heavy rainfall".(3.12)

However, it is stated earlier that

"the relative importance of the pollution loading from these overflows to the Lagan has not been quantified although on a subjective basis is considered to be significant" (3.12)

In fact raw human sewage discharges all the time from outfalls as any river user could inform the Working Party. (See Table IV). Pollution which is the most pressing problem is almost ignored without any definition of legal responsibility nor an account of what legal action the DOE as the responsible body has taken to stop pollution under the terms of the Water Act (N.I.) 1972.

It is known that the DOE completed fairly extensive sampling of the Lagan prior to the report but the section dealing with pollution gives no detail of the analytical results of this sampling.

The foul odour from the river which causes the riverside inhabitants such discomfort is nowhere mentioned! The only occasion it is alluded to is where

"Experience in Belfast Harbour suggests that the material (mud and silt) may not be suitable (for land reclamation) due to the offensive odour which it may create in the city centre". (5.27)

Obviously the all-year-round odours can affect the riverside inhabitants without the DOE being concerned but their apparent reasoning is that more sensitive noses of the rest of the population are not to be disturbed by the removal of the offending material through the City.

Mention is made of

"a major housing rehabilitation project in the Lower Ormeau". "It is not envisaged however, that the scope of the work directly resulting from these particular activities will extend to the river to any great extent" (3.20)

It would appear that the DOE has little intention of cleaning up the river to the extent that the inhabitants of these housing projects can consider the river as a valuable asset.

#### 4.4 A Water Authority

The DOE Working Party states that

"the Lagan problems..... might seem to derive from a failure or lack of will on the part of successive public authorities either individually or collectively, to initiate remedial works at the appropriate time and on a sufficient scale".

It is this Working Party's opinion that the above statement is valid and that the DOE is not the body to deserve direct functional responsibility for this amenity of such importance to the City. Only a Water Authority along the lines of the Thames Water Authority can provide the necessary commitment and freedom of action. The DOE has proven this by:

- (a) producing an unacceptable report;
- (b) its evasion of the pollution problem;
- (c) its lack of action to stop pollution by either itself or from industrial and agricultural sources;
- (d) its infilling proposals;
- (e) its refusal to recommend the necessary clean-up;
- (f) the priority always given to roads and the consequent conflict of interest in relation to the water responsibility of the DOE.

As this report is written the only visible DOE activity on the Lagan, apart from some attractive bridge painting, is as follows:-

- (i) The destruction of amenity ground and 50 mature trees at Annadale Embankment to apparently clear a non-existing traffic bottleneck but which is really the start of the Belvoir Road scheme which is designed to go through a bird sanctuary in the Lagan Valley Regional Park.
- (ii) The building of an unsightly car park on the lovely open space at Stranmillis.
- (iii) Extension of Laganbank car park.
- (iv) The dense planting by DOE of rowan trees along the steep river banks. As these trees grow to between 15 and 20 metres their growth will make it impossible for the river to be seen, and

coaches will not be able to speak to their crews. Fortunately they are so inexpertly planted that many will die but in the meantime they will make it extremely difficult for the City Council to cut the grass.

(v) Extending the width of the footpath on the Annadale side within the Lagan Valley Park to cover almost all the of the grassed river bank area for a distance of almost 200 metres. This Working Party has no knowledge of any consultation with the Lagan Valley Regional Park Committee before these works were commenced.

(vi) Uprooting a new pavement at Methodist College Rowing Club and leaving it in a dangerous condition since last year and partly infilling the lock with topsoil!

Further it is cause for concern that although the DOE Report has been rejected by all those with an interest in the river including the Belfast City Council nevertheless it was frankly stated to the Council in a special session that the Government was immediately proceeding with this set of misguided proposals.

#### 4.5 Conclusions of the DOE Working Party and Comment Thereon

The present functions of the Government Departments in relation to the river are stated in their report and a hearty endorsement is given to these ill-defined functions. It is not unnatural that thus having concluded that the administrative framework is satisfactory and functions are even now being carried out (tree planting, etc.) that the finding in relation to investigatory point (d) in the terms of reference of the Working Party ("any legislative action that may be necessary or desirable") is in the negative. This is a very wrong conclusion for the following reasons:-

- (i) it shows ignorance of the legislation affecting the river and which is ignored in the report;
- (ii) it fails to grasp that ordered progress is impossible under the present legislation for the reasons given in this Report. (Even if one does not accept the recommendation in this Report for a Water Authority);
- (iii) legislative and administrative reform must occur to abolish the anomalies of the legislation, to re-arrange legal and administrative functions to ensure proper maintenance of existing and planned works, and most important to ensure that the Water Act (N.I.) 1972, even in its present form is workable;
- (iv) reform is necessary to up-date Northern Ireland anti-pollution law to bring it in line with that in Great Britain;
- (v) if the necessity for a Water Authority is accepted, then further legal reform is necessary to create the necessary structure.

It is indeed impossible to understand what is meant when the Report concludes by saying in relation to further development that

"It must be acknowledged, too, that river-user interests and the river neighbourhood communities would have a by no means insignificant part to play" (8.06).

The DOE Working Party was set up without consultation with bodies with local practical knowledge or bodies

having a direct interest in the river, and refused such representation during its deliberations. Further, action is now being taken without such consultation and representation.

The DOE Lagan Report has arrived at its unacceptable conclusions by use of incorrect assumptions, apparent lack of technical knowledge and proper investigation, ignorance of the potential of the river and lack of consultation with those knowledgeable about the river. The overriding interest of the DOE in roads creates conflict which debars any balanced view in relation to the river.

When such a report is the basis for "railroading" action to implement these conclusions then there is cause for alarm.



CHAPTER 5 : CONCLUSIONS AND RECOMMENDATIONS FOR ACTION

- 5.1 Administrative Reform
- 5.2 Legal Reform
- 5.3 Engineering Aspects
- 5.4 Economic and Social Priorities
- 5.5 Recommended Action
- 5.6 Recent Developments and Conclusions



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## 5.1 Administrative Reform

- (i) This Working Party recommends\* that:- it is essential that the legislative framework as in Great Britain is adopted and that a Water Authority is established. Otherwise, further deterioration of the river bed, banks and water quality could take place due to administrative division of powers and confusion and neglect of aims and obligations as at present.
- (ii) The jurisdiction powers and obligations of this Authority should be strictly defined.
- (iii) Appointment to the Board must include community, sporting and amenity interests as well as those of Government.
- (iv) The Authority itself must have defined aims and continuing and detailed obligations which can only be changed by Parliament.
- (v) The jurisdiction of the Water Authority to extend to defined lands adjoining the River and the construction and alteration of all bridges and roadways within that area.
- (vi) Finance be annually allocated to enable it to fulfill its obligations.

The suggested jurisdiction of the Water Authority is based on sound planning principles and would avoid a repetition of such ill-considered action as the building of the ("temporary") Governor's Bridge on one of the sharpest bends of the River without any consultation with river-users when its resiting a short distance away would have avoided any such problem.

\* See page 66

## 5.2 Legal Reform

With the creation of a Water Authority there would not only be a mandate but also complete freedom for prosecution against all polluters under all legislation and not only the occasional prosecution under the Fisheries Act 1966 in rural areas as occurs at present. The Police and/or the Office of the Director of Public Prosecutions should be statutorily obliged to receive complaints from the public under either the Fisheries Act and/or the Water Act and be "serviced" in their investigations of the complaint by an obligation on, for example, a body such as the Department of Industrial and Forensic Science. If there is still any difficulty here by virtue of the connection of this Department with the DOE then a separate body should be set up for this purpose, which could also service other Water Authorities and complaints originating from other parts of Northern Ireland.

The Pollution Control Branch of the DOE must have their "authority" turned into a defined obligation without the practice of "warnings" etc., and in the case of a complaint emanating from any individual or Authority, they must not have any power as a Crown Department to take over the investigation and smother it by inactivity. Indeed, with a proper independent agency it would be difficult to justify continuation of the pollution control function in Government, due to the factor of the over-riding conflict of interest.

The Fisheries Conservancy Board should have the right to use the Lagan Water Authority and its anti-pollution service for the purpose of anti-pollution prosecutions - this would avoid being at the mercy of any inaction by the existing servicing of the DOE.

A close look should also be taken at the Water Act (N.I.) 1972 in relation to the granting of consents to pollute and that Act should also be further amended to allow prosecution by an individual or body other than Government.

In England and Wales Part 2 of the Control of Pollution Act 1974 which allows a private citizen to prosecute is shortly to be put into operation as a result of recommendations made to the Minister by the National Water Council in England and Wales. It is a reflection on the DOE to note that the Water Council of England and Wales has investigated pollution and has published its recommendations for water quality objectives and the Environment Minister has stated<sup>(13)</sup> there that the fixing of the operative date for Part 2 of the British

Act is a result of these recommendations. The Water Council for Northern Ireland has taken no equivalent action. The Council for England and Wales also states that these quality objectives should be determined by the Water Authorities. Of course this cannot occur in Northern Ireland where such Authorities do not exist.

Part 2 of the Control of Pollution Act 1974 relates to positive obligations being placed on Water Authorities in England and Wales regarding preparation of anti-pollution schemes, their power to have consents issued by the DOE and very detailed definitions of the circumstances in which such consents will be given and the restrictions thereon. This is a much more advanced piece of legislation than the Water Act (N.I.) 1972 and is worthy of consideration.

The Pollution Control and Local Government (N.I.) Order 1978 is the apparent Northern Ireland version of the 1974 Act insofar as it relates to rubbish and waste disposal and control of noise and atmospheric pollution but an equivalent for Northern Ireland of Part 2 of the 1974 Act does not exist for the simple reason that we have no Water Authorities as Part 2 concerns the obligation to prepare proposals regarding water standards in relation to uses and the related question of the granting of consents. However, even without a Water Authority the obligations of Part 2 could still be imposed upon the DOE in Northern Ireland and this omission can only be regarded as intentional. In the context of the British Water Council making recommendations for the operation of Part 2 it is clear that if a case is to be made for the retention of the Northern Ireland Water Council, a body set up by Section 4 of the Water Act (N.I.) 1972 and constituted by Government nominees, a better record of constructive action and achievement in relation to pollution control and other aspects of the Lagan would need to be in evidence.

An extremely important section of Part 2 of the Control of Pollution Act 1974 is that it will allow a private individual to prosecute. This should be an amendment to the Northern Ireland Act together with further amendments to remedy the weaknesses which nullify the effect of the legislation here e.g., Section 5(3) of the Water Act (N.I.) 1972 which gives a good defence to a party who can show that he has taken reasonable care to prevent polluting discharges.

Progress must be founded on certain objectives and perhaps no better commentary can be found on principles in relation to progress under the 1974 British Control of Pollution Act than that of the Director of Scientific

Services of the Thames Water Authority<sup>(14)</sup> when he reviews the question of the issue of consents to pollute in relation to quality objectives. Regarding the quality objectives the Director states as follows:-

- (a) There should be a specification of quality objectives for all significant reaches of river and stream.
- (b) Quality objectives should be stated as short-term and long-term.
- (c) Existing consent conditions would be generally reviewed on a scientific basis to produce and contain the stated short-term quality objectives on rivers.
- (d) In setting their quality objectives, the Water Authorities should consult with the bodies interested in river quality.

It is especially on the last point that the shortcoming of Northern Ireland is exposed - there are no Water Authorities and it is difficult to contemplate action along the aforementioned lines without such authorities.

### 5.3 Engineering Aspects

This report is not intended to detail facts and figures relating to recommended works, but simply to make suggestions as to what this Working Party contends is needed to make the Lagan available for "Sport for All".

The DOE Report acknowledges the need for the eventual removal of the McConnell Lock and Weir and the creation of a new Weir at the Harbour, but if short-term works are to be considered as a foundation for progress then an essential immediate task is the removal of the sludge both above and below the existing Weir. Covering up this septic monstrosity by a permanent head of water created by the proposed new Weir giving a shallow covering will not eradicate this problem.

It is feasible to start large basic changes in the disposal system which could be incorporated into and improve the present system. These changes should be so designed that the final "link-up" would result in a new system over a period of time. Enlargement and re-routing of certain main sewers and related pumping stations of the joint system could be made, while at the same time making a subsidiary storm water system, which, when the work was finished, would result in a separation over a short transitional period. This concept was suggested in correspondence to the Government Working Party but the only response was to refer to financial priority and the Report which was then being prepared. This Report has, of course, now been published but nowhere in it can be found any real plan along the lines as suggested by this Working Party.

It may be that only with the ultimate separation of foul sewage from storm surface water that the problem can be confined to the Belfast Sewage Station and a stage reached that London attained a century ago! To avoid the Belfast Sewage Station being unable to cope with the greatly increased volume, improvement and modernisation of the system in the Belfast Station along the lines adopted by London in the last 15 years would also have to be developed simultaneously. This modernisation might well include changes in the actual treatment process of the station so that pollution of the sea by the dumping of residuary sludge at the mouth of Belfast Lough can be stopped.

The situation in the City of Edinburgh should be of interest to Belfast in that, although the work on the sewers of that city in the last seven years involved radical works which co-ordinated the system, it was not a new system which was created. Work involved proper

capacity sewers and intercept sewers with attendant pumping arrangements and a proper modern sewage station at the "receiving end" of the system. The two objectives achieved with regard to sewer capacity were the interceptor sewers which reduced the amount of storm overflow and provision for automatic storm overflow limitation<sup>(15)</sup>. It may be that alterations of this type in Belfast, involving the elimination of all outfalls between Stranmillis and the Harbour and the creation of a main sewage station capable of dealing with all "joint" drainage, would be the most economic and rapid method of dealing with the problem but expert consultation and research is clearly urgently necessary. This method of improvement would ensure a much cleaner lower Lagan since such overflow of joint drainage as there would then only be in times of heavy rainfall and at those times heavy flow would ensure any unreasonable pollution level being confined temporarily to the Harbour and not the middle section of the river. This would especially affect the section from McConnell Weir to Stranmillis with the construction of the proposed weir at the Harbour this "clean" section of the river would extend for over two miles and any back-flow pollution would be further limited by the tides - not partially relieved by the tides as is the situation at present, especially in the summer months.

With the modernisation of the Belfast Sewage Station the question of sludge disposal will remain and forward planning should investigate the feasibility of utilizing this product as a valuable asset as fertilizer for agriculture.<sup>(16)</sup> Construction of the new weir cannot however take place until the outfall pollution problem is tackled since its construction without these complementary works would only create 3 miles of foul smelling heavily polluted water at low tides instead of 1½ miles as at present. The extent of what amounts to the Lagan being a huge sewage settlement tank would thus be doubled. The DOE Report simply does not consider this fact.



#### 5.4 Economic and Social Priorities

The potential of the Lagan given its location and width is considerably under-estimated. Evidence for this may be seen in the great growth of rowing activity over the past decade. Over 400 people use the river and usage is every day of the week. This is an indication of the increasing demand for the River as an amenity, which even the dreadful conditions have not suppressed.

Demand for water-based leisure activities is rapidly increasing and if the condition of the river were to be improved more opportunities would become available for the community in general. Furthermore, benefits would accrue mostly to the more disadvantaged sections of society as the River should be a major amenity for Inner City residents. This should be the priority - not even more road extensions along and over the River which stifle such recreational potential.

The Water Authority would be able to take account of and adapt to the development of changing uses of the River and due to its composition be responsible to the various interests of the community.

We hope this Report has illustrated the unco-ordinated legal planning and administrative framework which has resulted in the River Lagan being the open sewer it is today. The DOE Report rules out the necessary clean-up on grounds of priorities for Government expenditure but this Working Party regrets that no attempt has been made to estimate the social and economic benefits to be gained from eliminating pollution from the River. However, only when such an estimate is carried out can there be the necessary information for making a decision.

This omission of consideration of the benefits is all the more serious when it is known that the Inner City residents will continue to be deprived of access to the amenity. Priorities are indeed askance if use of the river is taken away from the people to be used as a waste disposal channel by industry and Government and the riverside to be used as places to route more and more traffic.

A river with clean water would also be an asset in terms of using the water for consumption, e.g., for domestic and/or industrial purposes and this could be recycled after treatment into the river. (17) Not only fish but also wild life would re-establish itself and the condition of Belfast Lough would also improve for sea angling.

A clean attractive water front would be a major environmental asset - it flows less than half a mile from the City Hall - perhaps if it flowed past this Administration Centre as in London where Westminster is at the riverside then it would long since have ceased to be used as an open sewer.

## 5.5 Recommended Action

Although the creation of a Lagan Water Authority is considered by this Working Party as the correct approach to the solution of the Lagan "problem", a summary is now given of recommended action either within or outside the present legal and administrative framework.

### 5.5.1 Practical Steps in Suggested Order of Priority and Practicality

(a) Put McConnell Lock and sluice in working order to enable dredging above McConnell Weir with barges being brought through the lock.

(b) Dredge from Stranmillis to Queen's Bridge.

(i) This could be done by using a crane on a floating pontoon (with the advantages of mobility and security) and sludge being removed by barges - possibly for disposal in Lough reclamation areas. Dredging close to banks can be by crane and drag and bucket with removal by lorry.

(ii) Alternatively using a small dredger with low superstructure to enable passage under bridges.

Dredging could continue during completion of other necessary works since this work is a basic necessity regardless of improvement of water quality.

(c) Decide whether

(i) Fully separated sewerage/drainage system to be made ultimate objective OR

(ii) A straight job of interceptor sewers on both sides of the river from Stranmillis to Belfast Lough with adequate related works to deal with the ultimate great increase in total joint volume at the Lough (other than simple discharge!)

Either of these methods or a combination of both would prevent any pollution other than that of surface water from direct street drains in this vital stretch of river. In heavy rainfall high volumes of clean water would sufficiently dilute any tidal intrusion containing any proportion of overflow at Harbour/Lough disposal works. The conclusive point here is that in dry weather the present gross pollution from the many sources indicated in this report would then be totally eradicated.

- (d) Immediate action to be taken to cost the alternatives indicated in (c) above - either of these alternatives could be the ultimate objective. From the DOE Report it would appear that the DOE has no clear and researched ideas in this important point of decision and planning. In a Water Service (DOE) paper read to Belfast City Council the cost of separation of foul sewage was estimated as being in excess of £40m. However, an alternative considered in that paper involved only larger sewers and/or provision of retention tanks for overflow conditions - we are by circumstances long past this stage of remedy as it only tampers with the existing provision of outfalls into the river. Further, the cost of this work would be a waste of money since it only puts off a further crisis at a cost which in itself would cost "in excess of £40m" and only complicate completion of either of the alternative works referred to above at a future date.
- (e) Works on interceptor sewers at higher than river level to be suspended until action is taken along lines indicated in paragraphs (c) and (d) above - this work would again be simply wasted investment at present unless preventing a local flooding problem and also work which is not warranted simply because of Lagan pollution since the DOE demonstrated that they have no precise knowledge of overflow of pollution into the Lagan, only that such proposed works "should lead to some improvement in overflow discharges to the adjacent rivers" - this is not the level of water engineering and expertise which will solve this problem.
- (f) Stop any further connections into the joint Belfast sewage/stormwater system pending solution of present problems.
- (g) Simultaneously with piping alterations (of whichever type) the Belfast main sewage station to be re-designed and re-constructed along the lines of the main Thames collecting stations which operate on the modern chemical "self-disposal" system, with minimum volume of residual solids.
- (h) To decide and define the river "amenity belt" in terms of width, vesting, demolition and landscaping and to co-ordinate with existing riverside planning. This would avoid piecemeal clearance such as at Oxford Street beside the Queen's Bridge where a car park is automatically created from old quayside - once a car park is there, it is difficult for any planner to have it removed to make way for an overall plan. If these reclaimed areas were to be automatically landscaped this would

show a more sound objective. The recommendations of this Working Party in relation to riverside development include creation, re-allocation and development of amenity land as follows:

- (i) adoption of the recommendation in the 1969 Belfast Area Plan viz. removal of embankment road between McConnell Weir and Ormeau Bridge.
- (ii) removal of road between King's Bridge entrance to Q.U.B. Physical Education Centre to allow Botanic Gardens to sweep down to the river.
- (iii) creation of riverside park on land presently occupied by Lagan Bank car park and north corner of bus station and part of Laganbank Road so that a park is created at the end of Chichester Street thereby creating the only park within walking distance of the city centre.
- (iv) creation of riverside amenity land on the County Down side by clearance of existing premises between Albert Bridge and proposed new bridge below McConnell Weir thus avoiding detrimental infilling.
- (v) limited infilling of unuseable areas of river only.

These recommendations are indicated in Map VI.

These recommendations are made for the following purposes:-

To remove roads from running along the river except where absolutely necessary e.g. river crossings.

To create where possible a continuous river walk with proper grass and wooded linear park area (but not to screen the walkways along the river by trees as is being done beside the footpaths at present!). Only by continuous development such as this can social problems such as vandalism and violence in isolated pockets of amenity development be minimised.

To remove as a matter of principle buildings which have no need to be beside the river or "show their backs" to the river. The purpose of this is to turn public attention to and not from the river. Only with proper riverside amenity would this aim be achieved.

When such development is complete it can be put under the jurisdiction of a Water Authority

which could prevent such future building detrimental to the river amenity.

The implementation of these proposals will naturally involve adaptation of the City roads system to re-route the commuter and through traffic which at present uses the boulevard roads.

- (i) Consult with those interests concerned with the Lagan to determine requirements and then engineering and construction aims and then to seek expert assistance from water authorities in Great Britain (preferably the Thames Water Authority) with practical knowledge and experience of improvement works.

5.5.2 Action Under the Existing Legislation (Pending Total Reform)

- (a) To require the Belfast Harbour Commissioners to provide a proper Navigable Channel from the Harbour to Stranmillis in accordance with present amenity and sporting demand and to require the opening of the McConnell Lock to permit passage of all vessels - both of these requirements would be pursuant to the Belfast Corporation Act 1924.
- (b) To require the Belfast City Council to carry out its statutory obligations to repair the McConnell Lock and sluice pursuant to the Belfast Corporation Act 1924.
- (c) To require the Belfast City Council through its Inspectorate to take action in relation to breaches of the Public Health Acts in relation to the Lagan pollution.
- (d) To require the DOE to take action under the Public Health Acts, the Fisheries Act (N.I.) 1966 and the Water Act (N.I.) 1972 in relation to pollution of the Lagan and its consequences. The legal weaponry is there for those who have the will and/or the mandate to use it. This *Working Party* does not have such a mandate but wishes to see action by those in responsible positions.

It would appear that proceedings for breaches of the Belfast Main Drainage Act of 1887 for pollution outside the period of the ebb tide cannot now be taken due to the sewerage function now being vested in the Crown.

## 5.6 Recent Developments and Conclusions

Although this *Working Party* has given its suggestions for effectively tackling the Lagan problem, it is realised that a very positive approach coupled with a high degree of commitment to their obligations on the part of the present responsible bodies is clearly required if action as indicated in this report is to be taken. The fact that certain works suggested in the DOE Report are now being undertaken should not be allowed to cloud the issue nor to give any credence to the view that changes in legislation and structures are therefore unnecessary. This Working Party is convinced that radical changes as identified in this report are urgently required. Indeed, it was feared by this Working Party that the real problem would be evaded in the DOE Report by some much publicised cosmetic scheme being undertaken by the present authorities thus avoiding any really effective action and re-structuring. This view has unfortunately been confirmed.

Already, the Belfast City Council has effectively passed a resolution of no confidence in the DOE and called for the establishment of a Water Authority, and the adverse reaction in the Press to the DOE Report since its publication shows a general ground swell of strong feeling about the situation. The view of the Minister expressed to the Belfast City Council that because conditions in Northern Ireland were different from Great Britain, that this was somehow a reason why anti-pollution action could not be pursued by the DOE only highlights the dilemma facing the DOE as it is both poacher and gamekeeper. The conditions in Northern Ireland are not different except insofar as the different structures have been created by Government.

Recently a decision has been taken by Government to abolish the Belfast Harbour Commissioners (a body elected on a restricted franchise) and to replace it with a Government appointed board. This Working Party is most concerned that within this new structure adequate provision be made for representation on the new board of sporting and recreational interests.

In the past the "life" of the river lay in its commercial use but now and in the future the fact that "life" is seen to be dependent on recreational, sporting and amenity use leads this *Working Party* to believe that it is now imperative for sporting, recreational and amenity interests to be represented on this new board.

Our goal is a restoration of the river to what it was before ill planned and inadequately constructed development and Government neglect left it the way it is today. We want a change from an open sewer to a river of sufficient purity where all have the opportunity to fish, swim, boat or simply stroll and enjoy the amenity.



\* One member of this Working Party although in accord with the findings of this Report dissents from the view of the majority regarding the need for a Water Authority. This view however is based on the pre-condition that the present legal obligations regarding the river be placed totally on Government and that the existing legislation be properly re-formed to enable this purpose to be achieved. The reasons for this opinion can be summarised as follows:-

- (a) Government has the direct financial resources to complete the necessary remedial work.
- (b) Government through its various agencies has the necessary expertise, if properly organised and directed, to improve the river situation and to maintain this improved situation for all time.
- (c) The responsibility for any default in carrying out improvements or maintaining an improved situation can then clearly be seen to be the responsibility of Government.



## APPENDIX

### Belfast's Combined System and its Effect on the River Lagan

The following calculations show how sewage ends up in the River given various storm water and sewage flows under varying conditions of rainfall - conditions which cover the majority of circumstances in Belfast and flows into the River Lagan. The calculations are illustrative, and are given to help understanding. They show orders of magnitude but do not cover all the various permutations and combinations of drains, rainfall, sewage etc. possible in the Belfast system.

#### Average Storm Water Flow in Drains

The average rainfall in Belfast is about 1 metre (39") per year. Accordingly the total volume of rainfall falling on one hectare (100 metres by 100 metres) is

1 x 10,000 cubic metres per year

or about

30 cubic metres per day

or about

1.25 cubic metres per hour OR 1,250 litres per hour

or about

20 litres per minute

Only about 75% (or less) of this rainfall goes into the drains as gardens vegetation etc. absorb the rest. Therefore the average flow in drains is about 15 litres per minute all the year round.

#### Average Sewage Flow in Drains

The average water usage per person in Belfast is 150 litres (approximately 30 gallons per day). Since the average population density in Belfast is about 30 persons per hectare (see Table II) the average flow per hectare is accordingly

30 x 150 l. per day

= 4,500 l. per day

or about 3 l. per minute.

#### Design of a Combined Sewer Flow System

In a modern system sewage and drainage water are in separate pipes. However, Belfast does not have this system but instead has a combined system, i.e., sewage and drainage water use the same sewer pipes. Thus in a combined system if it is designed to carry twice the average flow from rainfall (2 x 15 l. per minute) or ten times the sewage flow (10 x 3 l. per minute)

it will have a capacity of 30 l. per minute (of which 3 l. will be sewage). Section 1 of the diagram illustrates the position of average rainfall where all the combined flow goes to the treatment works with no overflow to the river (when the stormwater overflow is working properly - an unusual occurrence in Belfast)

#### Flow in Drains in Heavy Storm

A rainfall of 10 millimetres per hour occurs on average once a year (the Bilham formula gives about 12mm per hour).

Therefore the total volume falling on one hectare is  $\frac{10}{1,000} \times 10,000$  cubic metres per hour which equals 100 cubic metres per hour or about 13 cubic metres per minute of 1,667 l. per minute.

As before only about 75% goes to drains so that stormwater flow in the drains is about 1250 l. per minute.

Because of the carrying capacity of the pipe only 30 l. per minute goes to the treatment works. If the sewage (3 l.) is uniformly mixed with the stormwater (1250 l.) then only about 0.24% of the water going to the treatment works is sewage. Therefore only 2.4% of the sewage goes to the treatment works, i.e. approximately 98% of the raw untreated sewage goes into the river. Section (2) of the diagram shows this situation.

#### Flow in Drains in Prolonged Period of Light Rainfall

A rainfall of 1mm per hour occurs very frequently (say 20 times per year), therefore total volume falling on one hectare

$$\begin{aligned} &= \frac{1}{1,000} \times 10,000 \text{ cubic metres per hour} \\ &= 10 \text{ cubic metres per hour} \\ &= 10,000 \text{ l. per hour} \\ &= \text{approximately } 167 \text{ l. per minute} \end{aligned}$$

and as about 75% goes into the drains the total flow is therefore about 125 l. per minute.

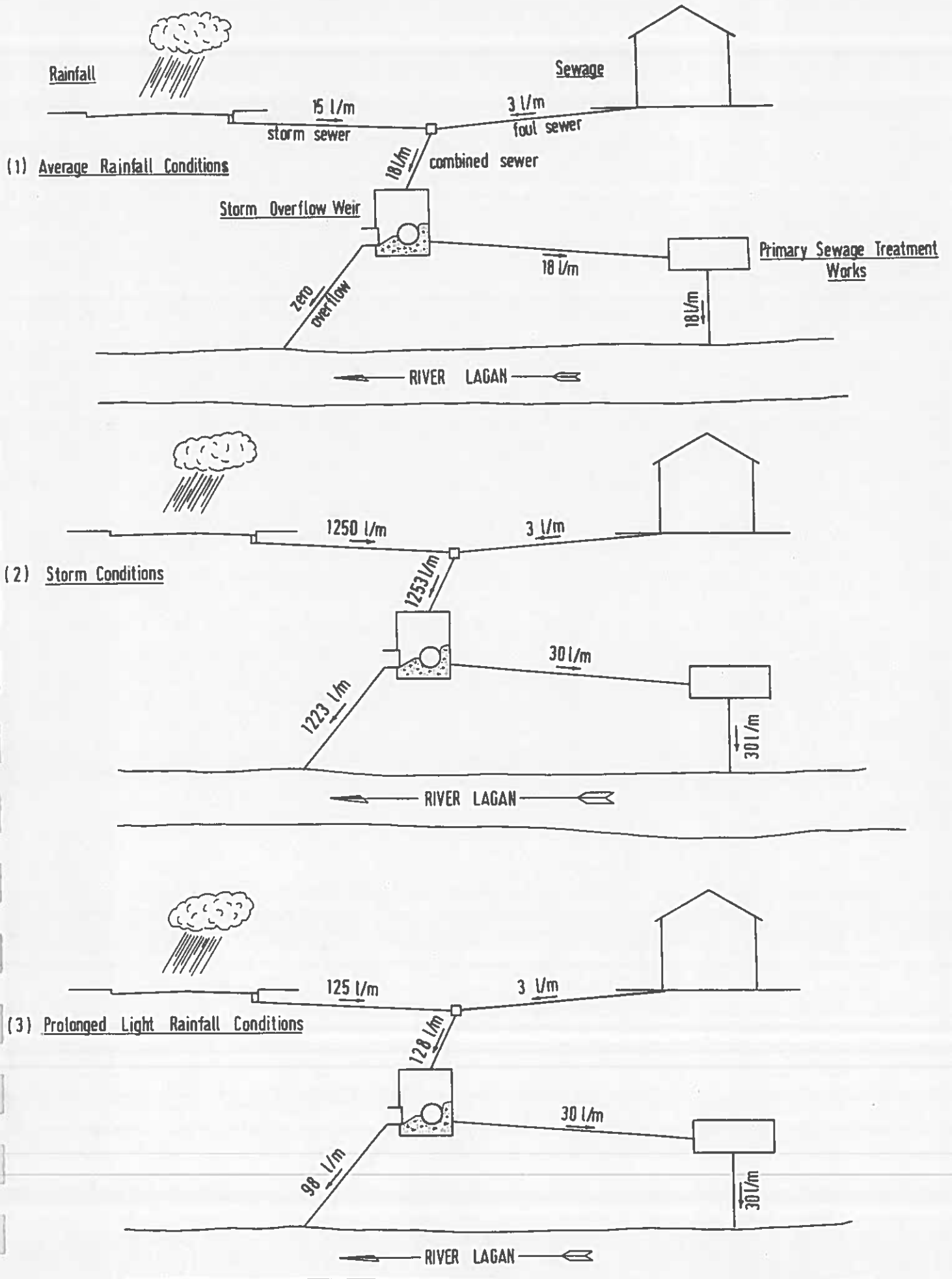
There are 128 litres per minute going into the drains (125 litres stormwater, 3 litres sewage) and as before only 30 litres goes to the treatment works of which only 0.75 litres is sewage the remaining 75% of the sewage going untreated into the River Lagan. Section (3) of the diagram illustrates this case.

A final point to note - sewerage stations are called "primary", "secondary" or "tertiary" depending on the degree

of sophistication of removal of impurities from sewage and industrial wastes. Where Belfast has treatment it is only the most primitive system - "primary" treatment.

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DIAGRAM — FLOW IN SEWERS



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TABLE I

Estimated Population of Belfast County Borough 1800-1971

Year	Population	Year	Population
1800	20,000	1881	208,000
1812	26,000	1891	256,000
1821	37,000	1901	349,000
1831	53,000	1911	387,000
1841	72,000	1926	415,000
1851	87,000	1937	438,000
1861	122,000	1951	444,000
1871	174,000	1961	416,000
		1971	362,000



TABLE II

Population<sup>(1)</sup> in Wards Contiguous to Lagan in  
Belfast District Council Area (3)

WARD	POPULATION	AREA IN HECTARES	POPULATION DENSITY
Rosetta	7,633	170	45
Ballynafeigh	6,674	54	124
Ormeau (2)	6,710	174	39
Island (2)	8,665	406	21
Ballymacarrett (2)	8,743	71	123
Stranmillis	7,939	345	23
University (2)	7,830	89	88
Cromac	6,991	112	62
TOTAL "LAGAN" WARDS	61,185	1,421	43
TOTAL OTHER WARDS	355,494	12,558	28
ALL BELFAST	416,679	13,979	30

(1) Source: Census of Population 1971

(2) Belfast "Area of Need" Ward

(3) Area differs slightly Belfast County Borough for  
which data is given on Table I

1941

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Income												
Expenses												
Balance												

1. The total income for the year is \$10,000.  
 2. The total expenses for the year are \$8,000.  
 3. The net income for the year is \$2,000.

TABLE III

LOCATION OF MAIN OUTFALLS

Map II shows the location of the main outfalls as identified by this Working Party. Numbers on the map refer to the list below. The list below however is of all outfalls in the City Lagan. Road gulleys along the embankments are piped individually to the river and are not shown.

1. Storm relief from sewer at Wanbeck Street
2. Stormwater outfall and storm relief from sewer at Stranmillis.
3. Stormwater outfall and storm relief from sewer in Embankment.
4. Blackstaff relief culvert.
5. Storm relief from sewer in Carmel Street.
6. River Terrace storm relief pumping station.
7. Laganbank Road stormwater pumping station.
8. Oxford Street storm relief pumping station.
9. Queen's Bridge storm relief pumping station.
10. Storm relief from sewer in Short Strand.
11. Storm relief from sewer in Ravenhill Road.
12. Storm outfall and storm relief from sewer in Ravenhill Road
13. Storm relief from sewer in Ravenhill Road.
14. Storm relief from sewer at Annadale Flats.
15. Storm relief from sewer in Sunnyside Street.
16. Storm outfall and storm relief from Annadale Estate.
17. Storm outfall from Annadale Estate.
18. Storm outfall from Annadale Estate.
19. Storm outfall from Annadale Avenue.
20. Storm relief from Lagan Valley sewer.

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TABLE IV(A)

ANALYSIS OF WATER AND SURFACE SLUDGE SAMPLES TAKEN ON  
13 SEPTEMBER 1976

General Weather Conditions

Heavy rain in previous 3 days; high flow level; tide out.

RESULTS

	<u>A</u>	<u>B</u>	<u>C</u>
Appearance	Water yellow in colour, large lump of floating excrement	Clouded, heavy deposit of black matter, giving off gas, small lumps of floating excrement	Clouded deposit of black coloured matter floating excrement, paper (toilet?)
Odour	Strong sewage	Strong sewage	Strong sewage
Nitrogen as free and saline ammonia	110 mg/l	8900 mg/l	60 mg/l
Nitrogen as albuminoid ammonia	16,500 mg/l	17,800 mg/l	86,500 mg/l

ANALYSIS OF DRIED SOLIDS

---

	<u>A</u>	<u>B</u>	<u>C</u>
% Organic matter.....	93.8%	71.5%	74.9%
% Oil.....	50.0%	41.8%	41.9%

---

The first part of the text discusses the importance of the scientific method in research. It emphasizes that researchers must follow a systematic approach to collect data and analyze it objectively. This process involves formulating a hypothesis, conducting experiments, and drawing conclusions based on the evidence. The text also mentions that the scientific method is a continuous process that allows for the refinement of theories as new evidence is discovered.

In the second part, the author talks about the role of ethics in research. It is stated that researchers have a responsibility to ensure that their work is conducted in a morally sound manner. This includes obtaining informed consent from participants, protecting their privacy, and avoiding any harm. The text further explains that ethical considerations should be integrated into every stage of the research process, from the design of the study to the reporting of results.



TABLE IV(B)

SLUDGE SAMPLES TAKEN ON 12 NOVEMBER 1976

General Weather Conditions

No appreciable rainfall for 7 days; tide coming in and beginning inflow over McConnell Weir.

RESULTS

	<u>D - Mud</u>	<u>E - Mud</u>	<u>F - Mud</u>
H <sub>2</sub> S	200.0 mg/kg	946.0 mg/kg	839.0 mg/kg
Free NH <sub>3</sub>	97.0 mg/kg	105.0 mg/kg	70.0 mg/kg
Alb NH <sub>3</sub>	243.5 mg/kg	280.0 mg/kg	163.2 mg/kg
Moisture	55.1%	72.5%	85.1%
Ash on dry	92.1%	83.3%	77.8%
Organic	7.9%	16.7%	22.2%

SLUDGES

The sludges are all septic and give off hydrogen sulphide.

The effect of this is two-fold. Firstly it will deoxygenate the water, and secondly in sufficient concentration in the atmosphere it is toxic to all mammals. It also leads to the blackening of all metal objects.

Note: Water samples taken at this time "G" to "I" inclusive are detailed in Table IV(C).

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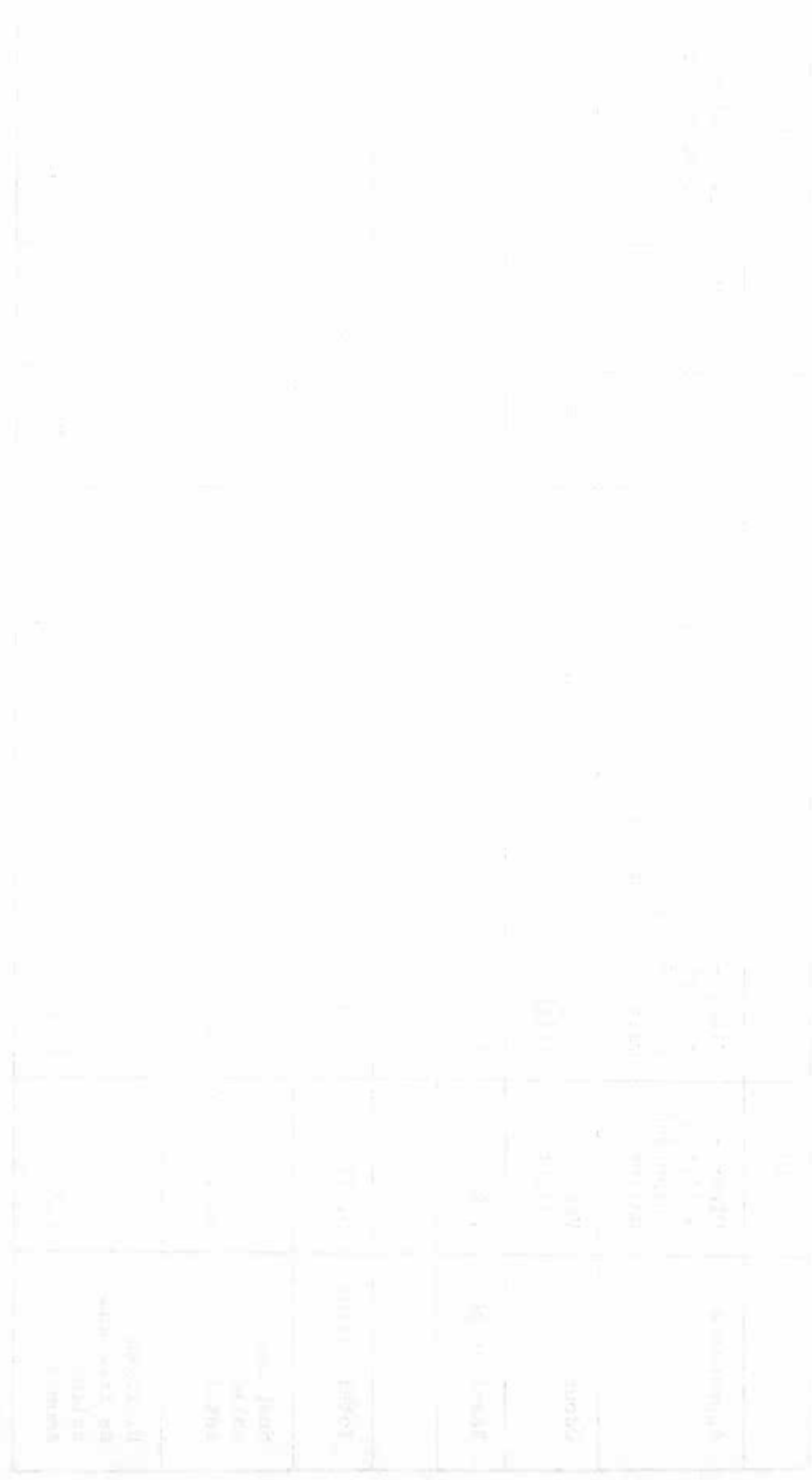
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TABLE IV(C)

Sample Results (G - N inclusive - Chemical) Samples J to N inclusive taken 11 January 1977 one hour before full tide with tide over McConnell Weir

	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'
Appearance	Clear - a little suspended matter	Clear - a little suspended matter	Clear - a little suspended matter	Clear	Yellow	Clear	Clear	Suspended matter Yellow colour
Odour	Very slight	Very slight	Very slight	None	Slight smell	None	None	None
Reaction pH	7.0	7.5	7.5	6.8	6.9	7.2	7.2	6.6
	- P A R T S P E R M I L L I O N -							
Total Solids	5,727	3,003	2,339	4,750	2,800	550	325	3,600
Suspended solids - total	n.a.	n.a.	n.a.	55	75	38	n.a.	1,266
Nitrogen - as free and saline ammonia	2.24	2.56	2.4	0.04	0.96	0.96	0.64	0.64



RESEARCH DEPARTMENT

RESEARCH DEPARTMENT



	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'
Nitrogen as albuminoid amonia	0.32	0.32	0.4	1.5	0.4	0.04	0.24	0.32
Nitrogen as nitrates	0.004	0.02	0.001	0.002	0.002	0.001	0.001	0.4
Nitrogen as nitrates	2.9	2.2	3.3	0.7	0.02	2.0	0.04	0.5
Chlorides as CL	3,060	1,430	1,060	2,550	1,450	250	87	1,650
Oxygen absorbed from permanganate in 4 hrs. @ 27°C	7.9	6.4	6.7	4.0	5.3	1.9	11.9	26.2
Bio-chemical Oxygen deman in 5 days @ 20°C	3.3	5.1	3.0	6.2	4.2	5.5	7.0	4.9

NO	NAME	AGE	SEX	REL	STATUS	REMARKS
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	'G'	'H'	'I'	'J'	'K'	'L'	'M'	'N'
Alkalinity	n.a.	n.a.	n.a.	95	160	60	110	90
Total Hardness	1,260	800	500	780	740	320	n.a.	640
% Saturation	79.2%	64.2%	95.0%	89.8%	87.4%	94.5%	94.5%	62.2%
Dissolved Oxygen	n.a.	n.a.	n.a.	11.4	11.1	12.0	12.0	6.0%
Temperature%	n.a.	n.a.	n.a.	4.5	4.5	4.5	4.5	17.0%

Контрагент	Сумма	С/Д	С/Д	С/Д	С/Д
Сбербанк России	10000				
К. Иванов	5000				
В. Петров	3000				
Итого	18000				





TABLE IV(D)

SAMPLES TAKEN ON 6 OCTOBER 1977

General Weather Conditions - very good for clean water.

Big content of rain and storm water and flow. Tide out.

Location of Sampling Points

1. 300 metres below Stranmillis Weir, 5 yards from South Bank.
2. King's Bridge, 2 yards from South Bank near small outfall.
3. 3 yards from Botanic Gardens outfall, North Bank
4. Midstream at Botanic Gardens outfall

RESULTS

	COLIFORMS/100 ml	FAECAL COLI/100 ml
1.	180,000+	55,000
2.	180,000+	180,000+
3.	180,000+	180,000+
4.	160,000	55,000



100 100 100

100 100 100

100

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TABLE IV(E)

SAMPLE TAKEN ON 30 MAY 1978

General Weather Conditions

No rain of any consequence for 10 days. Air temperature 70°F. South/south-west wind. Tide - 7 hours after high tide - approximately 6 hours water below McConnell Weir.

Location of Sampling Points

5. Taken mid-stream 30 metres above McConnell Weir
6. Taken from disturbed bed of river at north bank beside Shaftesbury Avenue.
7. Taken mid-stream 40 metres downstream from Ormeau Bridge
8. Taken mid-stream at outfall behind Botanic Gardens.
9. Taken in mouth of outfall - is typical example of prevalence of solids in this area.
10. Taken 2 metres from mouth of Pumping Station outfall on south bank beside King's Bridge.
11. Taken mid-stream at Belfast Rowing Club, Stranmillis.

RESULTS

	COLIFORMS/100 ml	FAECAL COLI/100 ml
5.	180,000+	180,000+
6.	160,000	17,000
7.	180,000+	180,000+
8.	180,000+	180,000+
9.	180,000+	180,000+
10.	180,000+	180,000+
11.	55,000	55,000



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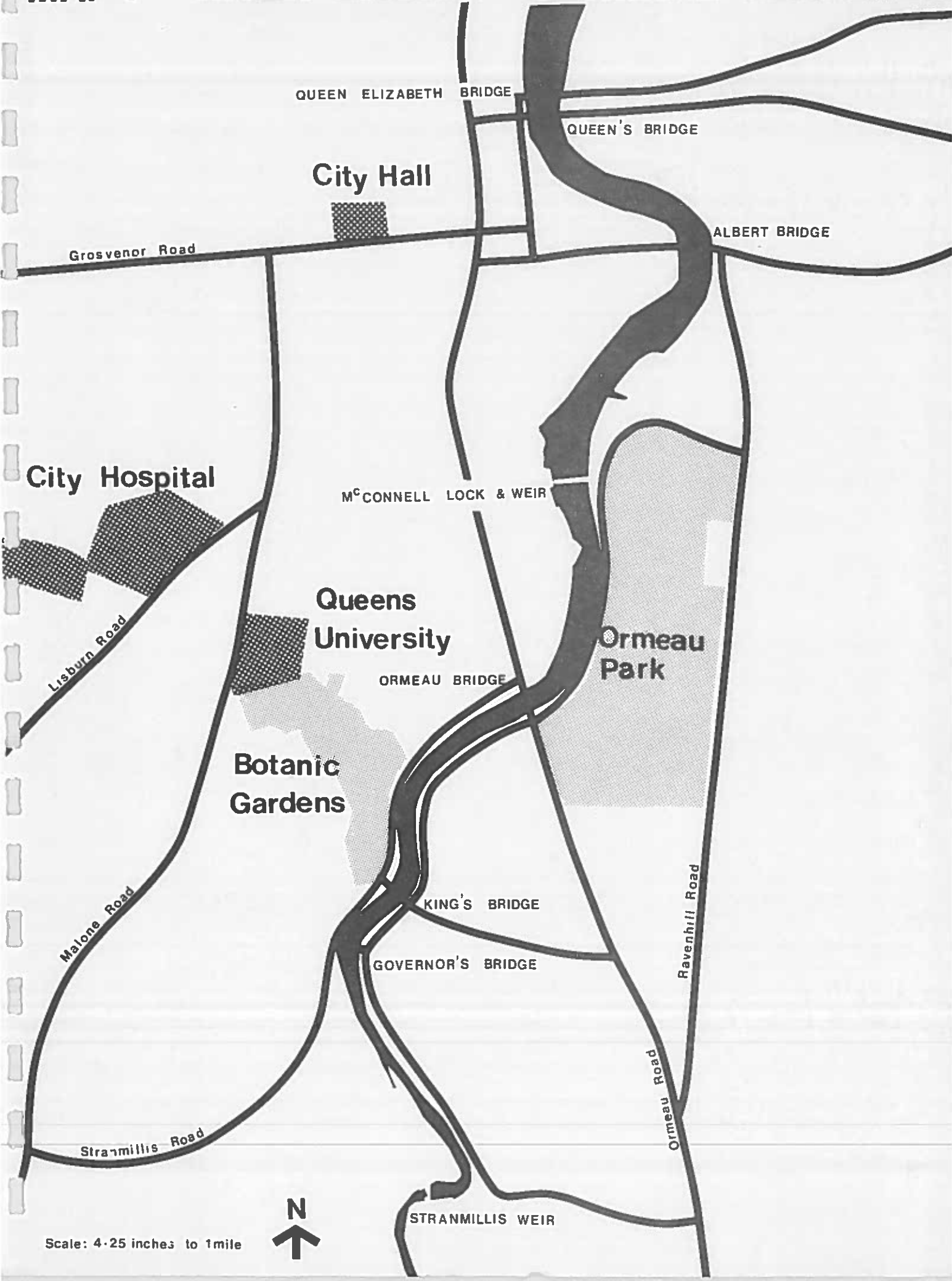
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- |     |                                  |   |                     |
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## II - LEGISLATION

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Belfast Improvement Act	(1845)
Belfast Improvement Act	(1850)
Belfast Main Drainage Act	(1887)
Public Health Acts	(1878 - 1973)
Belfast Corporation Act	(1924)
Lagan Navigation Act	(1954)
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Water Act (N.I.)	(1972)
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Control of Pollution Act	(1974) England and Wales only
The Pollution Control and Local Government (N.I.) Order	(1978)

# MAP I RIVER LAGAN – GENERAL FEATURES



QUEEN ELIZABETH BRIDGE

QUEEN'S BRIDGE

City Hall

ALBERT BRIDGE

Grosvenor Road

City Hospital

M<sup>C</sup>CONNELL LOCK & WEIR

Queens University

Ormeau Park

ORMEAU BRIDGE

Botanic Gardens

KING'S BRIDGE

GOVERNOR'S BRIDGE

Ravenhill Road

Malone Road

Stranmillis Road

Ormeau Road

STRANMILLIS WEIR

Scale: 4.25 inches to 1 mile



FEATURES

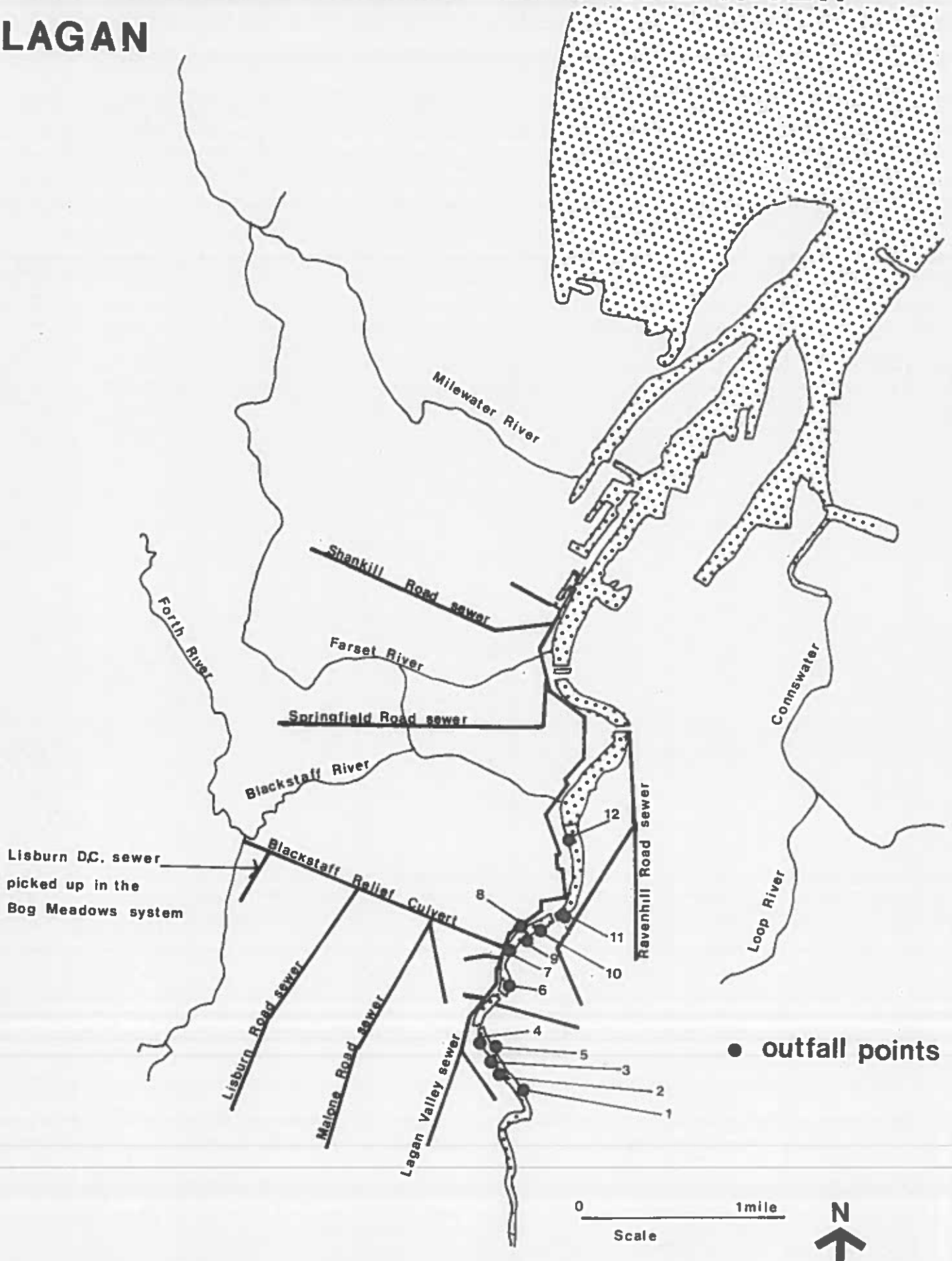


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# MAP II BELFAST CITY STREAMS, MAIN SEWERS AND OUTFALL POINTS INTO THE RIVER LAGAN



LAGAN  
AND OUTFALL



1. Kailash - water  
2. Ditch or canal  
3. Main channel

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The first part of the paper discusses the general principles of the method, which is based on the use of a special type of paper that is sensitive to the presence of certain substances. This method is particularly useful for the detection of trace amounts of these substances in complex samples.

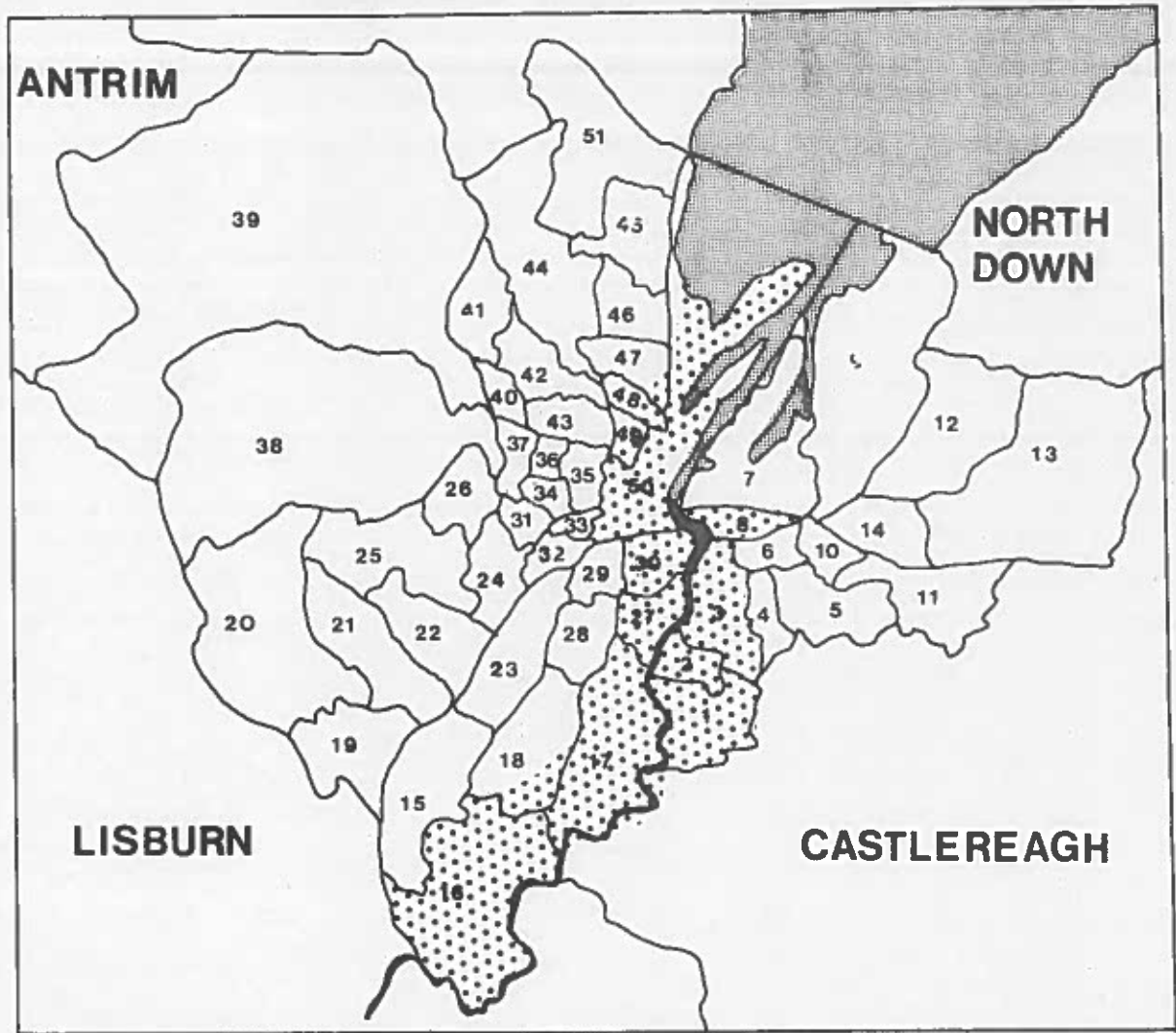
The second part of the paper describes the experimental procedure, which involves the preparation of the samples and the application of the method. The results of the experiments are presented in the following section, where it is shown that the method is highly sensitive and specific.

In conclusion, the method described in this paper is a simple and effective way of detecting trace amounts of certain substances. It is particularly useful for the analysis of complex samples, and it can be used in a wide range of applications.

biological  
 chemical



# MAP IV WARDS OF BELFAST AND COURSE OF THE RIVER LAGAN



- |                   |                  |                  |
|-------------------|------------------|------------------|
| 1 ROSETTA         | 18 MALONE        | 35 COURT         |
| 2 BALLYNAFEIGH    | 19 LADYBROOK     | 36 SHANKILL      |
| 3 ORMEAU          | 20 SUFFOLK       | 37 WOODVALE      |
| 4 WILLOWFIELD     | 21 ANDERSONSTOWN | 38 BALLYGOMARTIN |
| 5 ORANGFIELD      | 22 MILLTOWN      | 39 LEGONIEL      |
| 6 THE MOUNT       | 23 DONEGALL      | 40 ARDOYNE       |
| 7 ISLAND          | 24 ST JAMES'S    | 41 BALLYSILLAN   |
| 8 BALLYMACARRETT  | 25 WHITEROCK     | 42 CLIFTONVILLE  |
| 9 SYDENHAM        | 26 HIGHFIELD     | 43 CRUMLIN       |
| 10 BLOOMFIELD     | 27 UNIVERSITY    | 44 CAVEHILL      |
| 11 SHANDON        | 28 WINDSOR       | 45 CASTLEVIEW    |
| 12 BELMONT        | 29 ST GEORGE'S   | 46 FORTWILLIAM   |
| 13 STORMONT       | 30 CROMAC        | 47 GROVE         |
| 14 BALLYHACKAMORE | 31 CLONARD       | 48 DUNCAIRN      |
| 15 FINAGHY        | 32 GROSVENOR     | 49 NEW LODGE     |
| 16 UPPER MALONE   | 33 FALLS         | 50 CENTRAL       |
| 17 STRANMILLIS    | 34 NORTH HOWARD  | 51 BELLEVUE      |

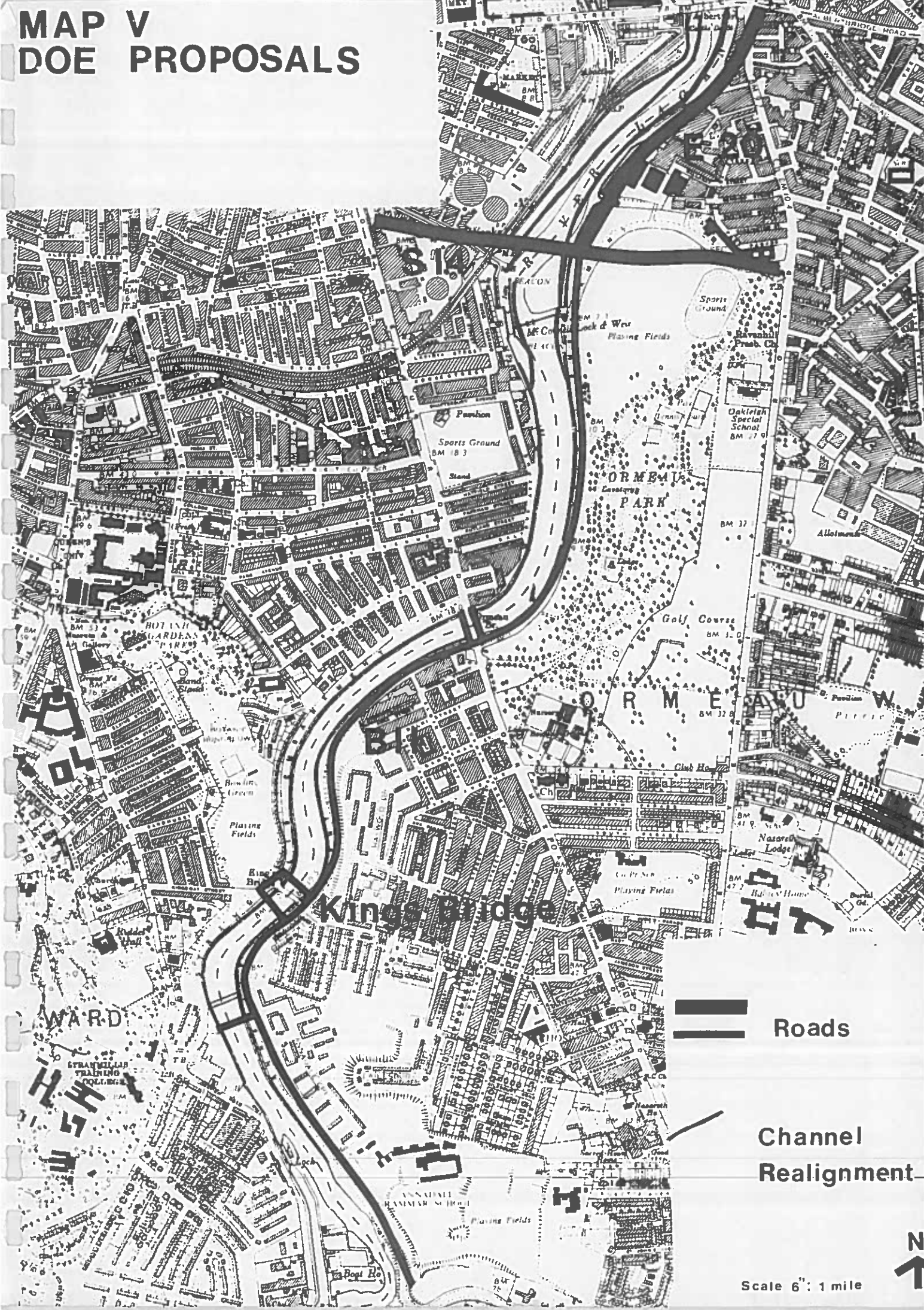


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# MAP V DOE PROPOSALS



**Roads**

**Channel Realignment**

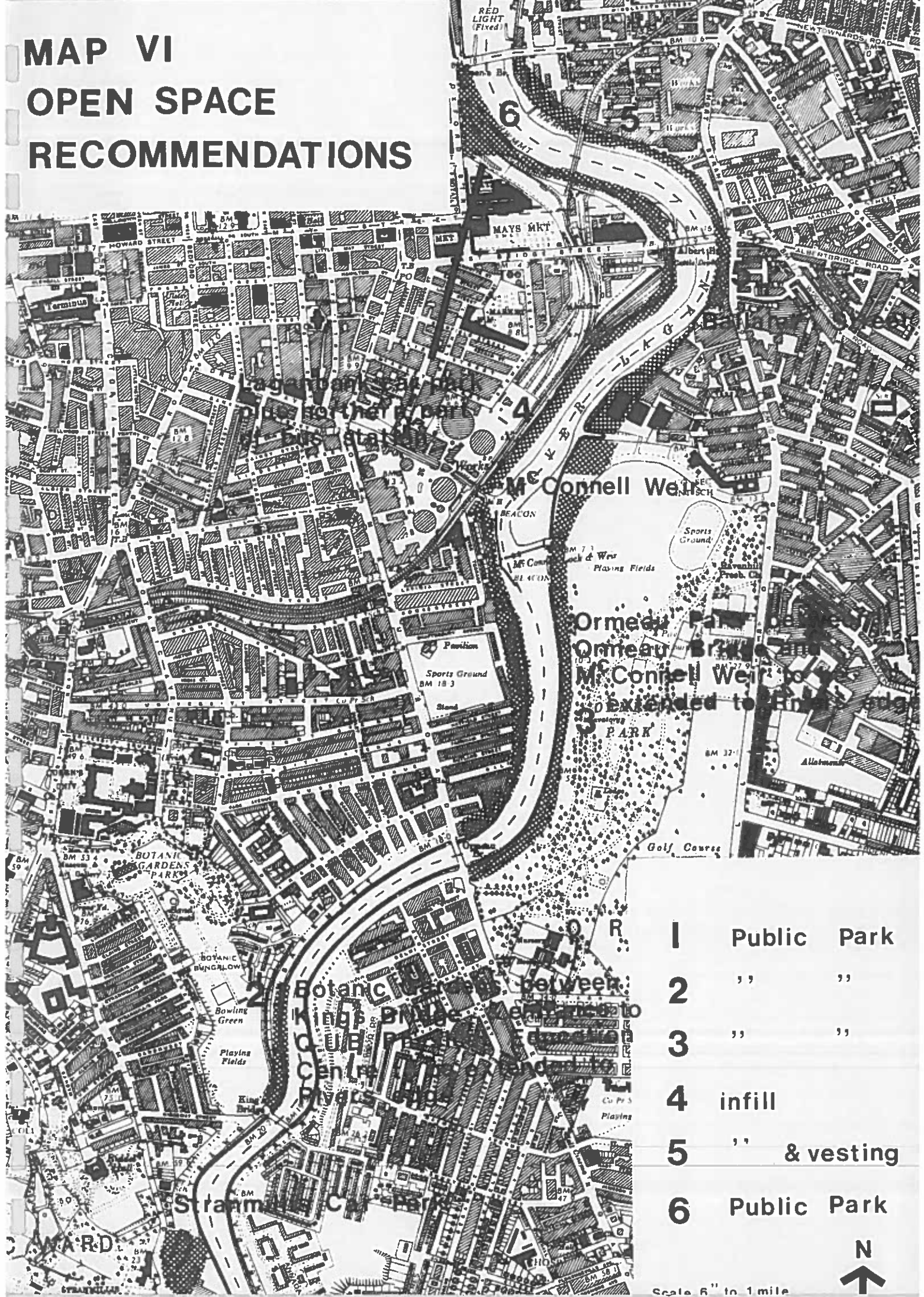
Scale 6" : 1 mile

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# MAP VI OPEN SPACE RECOMMENDATIONS



- 1 Public Park
- 2 " "
- 3 " "
- 4 infill
- 5 " & vesting
- 6 Public Park



Scale 6" to 1 mile



W 54th Street

Public Park  
Meeting

