NORFOLK AND SUFFOLK

LOCAL FLOOD DEFENCE COMMITTEE

ENVIRONMENT AGENCY

ANNUAL REPORT 1998/99

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ANNUAL REPORT 1998/99

In accordance with Section 17 of the Environment Act 1995, the report on flood defence works carried out during the year 1998/9 in the Norfolk and Suffolk Local Flood Defence District is presented herewith, together with a summary of the accounts for that year.

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Cover: Tidal River Yare at Reedham Ferry - Capital scheme in progress
(Photograph reproduced by kind permission of Mike Page of Strumpshaw)


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The aim of the Flood Defence function is to provide effective defence for people and property against flooding from rivers and the sea, and to provide timely warning systems such that effective actions can be taken to minimise the impact of flooding. This will be achieved by undertaking works that are technically sound, economically justifiable and environmentally acceptable.

PRINCIPAL STATISTICS

Total Length of Main River	1332 km
Total Length of Tidal Main River Defences	217 km
Total Length of Estuary Defences	107 km
Total Length of First Line Sea Defences (Environment Agency responsibility)	102 km
Total Length of Fluvial Main River (to MAFF demarcation point)	1097 km
Area of Local Flood Defence District	5329 km^2
Number of Internal Drainage Boards	36
Total Area of Internal Drainage Districts	584 km^2
Number in Workforce:	
Approved Emergency Workforce "core" number	62

NORFOLK & SUFFOLK LOCAL FLOOD DEFENCE COMMITTEE MEMBERSHIP

CHAIRMAN

Sir Edward Greenwell Bt, DL
Estate Office
Gedgrave Hall
Woodbridge IP12 2BX

APPOINTED BY THE REGIONAL FLOOD DEFENCE COMMITTEE

Mr. D.C. Adams
Deben View
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Ipswich IP10 0RA

Mr. H.G. Cator
Broad Farm
Salhouse
Norwich NR13 6HE

Professor T. O'Riordan (until July 1998)
University of East Anglia
Norwich NR4 7TJ

Mr. P.D. Papworth
Tuttington Hall, Tuttington
Aylsham
Norwich NR11 6TL

Mr. D.R.H. Price (from January 1999)
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Norwich NR2 3HG

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APPOINTED BY THE CONSTITUENT COUNCILS

Norfolk County Council:

Mr. P. Baldwin
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Mr. D.M. Bracey (from June 1998)
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Gorleston-on-Sea
Great Yarmouth NR31 8DB

Mr. M.V. Castle (until May 1998)
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Mr. N.G. Chapman
Lime Tree Farm Bungalow
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Norwich NR16 1HT

Mr. R.C. Rockcliffe
34 Thieves Bridge Road
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Mr. J.A. Sheppard (from June 1998)
145 Waterworks Road
Norwich NR2 4DF

Suffolk County Council:

Mr. G. Gouldby
36 Cotmer Road
Oulton Broad
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Mr. P.D. Monk
The Old Star Inn, The Street
Bawdsey
Woodbridge IP12 3AJ

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22 Badgers Bank
Ipswich IP2 9EN

OBSERVER

Mrs. S.V. Ashford (Norfolk & Suffolk Area Environment Group)
Holly Lodge
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Norwich NR13 4NS

OFFICERS SERVICING THE COMMITTEE

Acting Area Manager (until July 1998)	Robert Runcie	Area Flood Defence Manager (until December 1998)	John Hesp
(August-November 1998)	Paul Hayward	Acting Flood Defence Manager (from Jan 1999)	Stephen Worrall
Area Manager (from December 1998)	Hilary Aldridge	Regional Flood Defence Manager	Steve Wheatley
Regional Finance Manager	Ian Ripley	Catchment Engineer	Stan Jeavons
Operations Engineer	Mick Whiley	Management Accountant	Jim Chatburn

INTRODUCTION

The Eastern Area of the Environment Agency Anglian Region comprises Norfolk, Suffolk and Essex. The Area is an operational unit, headed by the Area Manager, who is a member of the Regional Management Team. Its structure is based on integrated catchment management to enhance the effectiveness of the efficient delivery of services across all Agency functions at Area level. Flood Defence personnel are split into client and contractor groups in recognition of the need to apply market testing to Agency operations in order to demonstrate its ability to provide value for money. The client group is headed by the Area Flood Defence Manager supported in Norfolk and Suffolk by a Catchment Engineer. The Emergency Workforce and supervisory staff are headed by the Direct Services Manager. This staff structure was modified with effect from 1 April 1999, the reasons for which are explained below.

The Ministry of Agriculture, Fisheries and Food for the eighth year in succession granted the Norfolk and Suffolk Local Flood Defence Committee an enhanced rate of grant in recognition of the continuing urgent need to upgrade flood defence standards in Norfolk and Suffolk. Following flood defence levy increases of 10%,15% and 10% respectively for the previous three years in recognition of the high level of funding required, the Norfolk and Suffolk County Councils were able to revert to a stand-still budget for 1999/2000 with a zero increase in levy. Even so, a high grant earning ceiling for 1999/2000 has been maintained by the Ministry in response to the local commitment that has successful increased the Committee's capital base. The continuing high level of funding during 1998/99 has allowed work to proceed, on a priority basis, on the most urgent works in Broadland ahead of the Broadland Flood Alleviation Strategy.

The Ministry's agreement to the Broadland Flood Alleviation Strategy was conditional upon an examination of its suitability for the Public/Private Partnerships Programme. I am pleased to report that the Government has raised the Agency's proposals to Pathfinder status. This is a key milestone prior to the letting of the PPPP contract over 20 years with the private sector, and is the first PPPP initiative to be linked to a major flood defence scheme aimed at protecting the environment.

The House of Commons Agriculture Select Committee Inquiry into Flood and Coastal Defence published its recommendations during the year under review and, depending upon the extent of its implementation, could have far reaching effects on the future funding and administration of flood defence. Arising from this is a requirement that the Agency should have overall supervisory responsibility for all land drainage and flood/coastal defence issues; this requirement has considerable implications in terms of financial and human resources.

The Easter 1998 fluvial floods that severely affected some parts of the country have generated a national project that has had a major impact on the majority of the year under review and will continue through the following year and beyond. Following the Easter floods the Agency commissioned an independent review, chaired by Peter Bye. "The Bye Report" recommended 85 priority actions, the phased implementation of which must be completed by April 2000. Implementation of the Action Plan is the Government's highest flood defence priority; it involves a huge workload and has a considerable impact on funding and staff resources. This runs parallel with the Agency's new supervisory role and several other flood defence initiatives such as the preparation of flood risk maps, which will be provided to planning authorities, and a comprehensive and ongoing asset survey of all sea and fluvial defences. Some additional staff have been recruited and many existing staff taken "off line" to undertake the work. With effect from 1 April 1999 the Catchments were split into Operations and Regulation teams to facilitate the exercise, and the "split" between client and contractor groups was be relaxed to maximise partnership and efficiency.

During 1998/99 Mr. D.M. Bracey, Mr. D.R.H. Price and Mr. J.A. Sheppard were appointed to the Committee. Professor T. O'Riordan and Mr. M.V. Castle resigned from the Committee. Ms Hilary Aldridge has been appointed to the post of Eastern Area Manager. Mr. John Hesp, Area Flood Defence Manager, has been taken permanently "off line" to take on the role of Regional Project Manager of the Easter Floods Action Group.

STEPHEN WORRALL
Acting Area Flood Defence Manager (Eastern)

HAPPISBURGH - WINTERTON FRONTAGE AT SEA PALLING
High tide

(Photograph reproduced by kind permission of Mike Page of Strumpshaw)

OPERATIONS REPORT - 1998/99

CAPITAL WORKS 1998/99

The Norfolk and Suffolk Local Flood Defence Committee's allocation from Anglian Region's Grant Earning Ceiling for 1998/99 was £7.6 million.

The basic rate of grant from the Ministry of Agriculture, Fisheries and Food was 55%, with a 20% supplement for tidal and sea defence works. The final out-turn figures for capital expenditure were:-

	1998/99 £K
Grant eligible work	8,359
Non grant eligible work	155
Salaries and consultants' fees	1,145
Total	9,659

A schedule showing this expenditure split down scheme-by-scheme is included in the financial summary at the end of this report.

The programme was again dominated by high priority sea and tidal defence schemes, the most significant of which are briefly described below:-

1. FRONTAL SEA DEFENCES

Hollesley to Bawdsey Sea Defences

Scheme No. MTB9140330 Expenditure 1998/99 - £24,000

Consultants Posford Duvivier were commissioned in August 1998 to undertake a coastal processes study and strategic appraisal covering the coastline from Shingle Street to North Felixstowe (FEL 1 and FEL 2). The coastal processes study will be completed in May 1999 and the subsequent draft Strategic Appraisal Report will be prepared for consultation, which is to commence in July 1999.

Salthouse Flood Protection

Scheme No. MTB41550 Expenditure 1998/99 - £49,000

The shingle ridge that forms these defences has become increasingly more difficult to maintain due to the lack of beach material being deposited along this frontage. In recent years this has reached a position where its continued use as a flood defence is considered unsustainable. The problem was discussed by local people and environmental groups who concluded that a new set-back secondary clay bank would provide the best long term protection. It is this option that is being progressed by the Agency and their consultants.

An Environmental Statement was prepared which resulted in the need for further investigations including both water level and beach management plans, together with extensive monitoring and data gathering of the whole site. Once these studies are complete, they will be used to support a planning application for the new clay embankment and outfall structures.

Wells and Burnham Overy Improvement Works

Scheme No. 40371 Expenditure 1998/99 - £12,000

The previous scheme to revet the lower slope on the Wells west embankment also identified the need for similar works to the upper slope, together with earthworks and revetment on the Burnham Overy tidal defences. Careful planning of the construction has been required to avoid disruption with the works programmed for summer 1999 and the following year.

2. TIDAL RIVER DEFENCES

Broadland Flood Alleviation Strategy

Scheme No. MTB43000 Expenditure 1998/99 - £952,000

The development of the Broadland Strategy as a Public Private Partnership Programme (PPPP) has continued. Initial proposals have been received from three Consortia. Early indications are that it will be possible to beat the public Sector Comparator estimate and that the project will therefore be able to proceed under PPPP. It is hoped to determine the preferred bidder by the end of 1999 and to enter into a 20 year contract during 2000.

Pending the outcome of the PPPP investigations, work in Broadland is confined to urgent and emergency works.

Broadland Compartment 11 - Halvergate Phase 9 - Berney Arms Reach

Scheme No. MTB40409 Expenditure 1998/99 - £874,000

The project to construct 575 metres of steel sheet piling and bank strengthening was completed by Tilbury Douglas Construction Ltd.

RIVER CHET AT FERRY ROAD – Before urgent works were carried out

SOUTH BREYDON - Before works were carried out

BROADLAND - RIVER CHET
Traditional steel pile repairs in progress
where depth of water precludes softer protection methods

Broadland Compartment 22

River Chet near Ferry Road and River Yare near Norton Marsh Mill

Scheme No. MTB43221 Expenditure 1998/99 - £394,000

The contract was completed by the Agency's Direct Services Group. Works comprised a total of 230 metres of steel sheet piling at two sites at Ferry Road and in front of Norton Marsh Windmill. The piles are tied to an anchor wall behind the embankment except in front of the Windmill where bearing anchor piles were used.

River Yare near Reedham Ferry

Scheme No. MTB40506 Expenditure 1998/99 - £688,000

The contract was completed by Tilbury Douglas. Works comprised 320 metres of low level steel piles supported by ground anchors installed from the river edge. Asphalt matting is installed behind the piling, planted with reeds.

Broadland Compartment 35 - Raven Hall Emergency Work

Scheme No. MTB43351 Expenditure 1998/99 - £2,101,000

Following the successful re-piling of 130 metres of collapsed piling, carried out as an emergency scheme, a tender for the remainder of the Raven Hall frontage was prepared. Construction of a further 720 metres of piling was subsequently carried out by Tilbury Douglas.

Broadland Compartment 36 - South Breydon

Scheme No. MTB43361 Expenditure 1998/99 - £582,000

This project commenced in 1998/99 and is programmed for completion in late 1999. Works comprise the refurbishment of 4.5km of revetment and crest piling. The contract is being carried out by Edmund Nuttall Ltd.

3. FLUVIAL SCHEMES

Hollesley Pumping Station

Scheme No. MTA9144809 Expenditure 1998/99 - £412,000

A contract for the design and construction of a new pumping station at Hollesley was awarded to Jackson Civil Engineering in August 1998. Following completion of the design, construction commenced in September. The new pumping station comprises two 0.75 cumec submersible pumps contained in an inlet structure with a weed screen and automatic weed rake. The twin pumping mains discharge into Barthorp's Creek via a flapped tidal outfall and stilling basin. The works were completed on 2 April 1999.

4. SHORELINE MANAGEMENT PLANS

4.1 The aim of a Shoreline Management Plan is to provide the basis for sustainable coastal defence policies within a sediment cell and to set objectives for the future management of the shoreline.

The first generation of SMPs for the Norfolk and Suffolk coastline, comprising three plans [from Snettisham to Sheringham (Sub cell 3A), Sheringham to Lowestoft (Sub cell 3B) and Lowestoft to Harwich (Sub cell 3C)] have been adopted by all relevant Operating Authorities. These plans were originally envisaged to be updated at five yearly intervals.

The North Norfolk SMP (Sub cell 3A), completed in July 1996, is effectively the first plan that needs to be updated and may in fact be one of the first SMP second generation plans to be addressed nationwide. Prior to commencing an SMP review, new national requirements have been introduced that require a "Coastal Habitats Management Plan" (CHAMP) that will address environmental policy implications, and also MAFF official guidance on the "Framework for Preparing Second Generation SMPs" to be in place. The current unavailability of both documents is, however, likely to delay the five year review of SMPs in both Norfolk and Suffolk and elsewhere in England and Wales.

4.2 Individual Suffolk Estuarine Strategies that generally follow the format of a Shoreline Management Plan are being prepared for the Rivers Alde/Ore, Blyth and Deben. It is envisaged that the final strategies will be available in the autumn of 1999.

HOLLESLEY PUMPING STATION

SUBMERSIBLE PUMP
BEING DELIVERED

NEW PUMPING STATION WITH WEEDSCREEN BEING POSITIONED

HAPPISBURGH – WINTERTON FRONTAGE (EAST NORFOLK)
Repairs to existing groyne structures following tidal surge where depth of water precludes softer protection methods

MAINTENANCE AND EMERGENCY WORKS 1998/99

Summary

The tidal and fluvial resources and emergency responses in Norfolk and Suffolk are managed by the Catchment Engineer and his staff of 13, based at Norwich and Ipswich.

In 1998/99 the Catchment, representing the Norfolk and Suffolk Local Flood Defence Committee, prepared and completed a revenue programme of maintenance works to the value of £2,563,000, approximately 10% of which was competitively tendered, the balance being awarded to the Direct Services Group.

In addition to the planned and routine maintenance works carried out on the 1500km of Main River and 410km of sea and estuary defences in the Catchment and the management of emergency responses, the following factors have influenced the programme of works and expenditure in 1998/99:-

- The aftermath of the Easter 1998 fluvial flooding event.
- The continuing need to prioritise maintenance works to protect people and property within flood risk areas.
- The deteriorating tidal flood defences in Broadland and the rural Suffolk estuaries, ahead of approved capital expenditure under the Broadland Flood Alleviation Strategy/Public Private Partnership Programme and Suffolk Estuaries Strategy.
- Low fluvial flows and reducing maintenance frequencies leading to increasing silt deposition and invasive vegetation growth in the freshwater river system.
- The balance needed to meet recommended maintenance standards and minimum flood return frequencies whilst meeting our statutory environmental objectives in a Catchment with increasing multi-layered designated areas.
- For the second year the ongoing revenue maintenance commitments necessary on the sea defence frontages at Brancaster and Salthouse ahead of policy decisions on their future.
- The need to identify fluvial and tidal flood risk areas and to determine the standard and priority of their protection.
- The extensive coastal frontage of soft defences in Norfolk and Suffolk subject to tidal damage that require frequent maintenance and monitoring.

These and other factors have challenged the resources available to the Catchment in this financial year. The revenue expenditure for 1998/99 again included an additional 2.5% granted by the Local Flood Defence Committee to assist in meeting the

increased revenue costs of maintaining our deteriorating assets for the fifth and final year. The budget target was met within 0.2% including emergency and contingency items.

The use of external contractors continues to complement the service provided by our in-house team, particularly where the supply of specialist equipment, plant and resources are required and where external contractors have been successful in winning competitive contracts.

Approximately 75% of the total maintenance budget was allocated to individually identified and planned revenue jobs, whilst the remaining 25% were expended on emergency events and tasks of an unplanned nature. The total maintenance expenditure during 1998/99 (with the previous year's figures for comparison purposes) was:-

	1997/98 £K	1998/99 £K
Maintenance of Sea and Tidal River Defences	1,408	1,466
Maintenance of Inland Waters	853	1,097
Total	2,261	2,563

Sea Defence, Tidal and Fluvial Maintenance Works

The following report describes some of the revenue works undertaken in the Catchment in the past year, and identifies the expenditure incurred on maintenance activities.

Sea Defence Works

General

The sea defence frontage for the Norfolk and Suffolk Local Flood Defence Committee extends from Old Hunstanton in West Norfolk, along the Suffolk frontage to Shotley near the Essex border. The 102km of defences range from hard steel and concrete floodwalls to softer frontages of shingle bank and sand dunes. These softer natural defences are particularly vulnerable to aggressive winter storm damage requiring ongoing and frequent maintenance to ensure the continuing integrity of these frontages. Shingle beaches are especially vulnerable to wave and tidal action and the shingle bank defences at Cley to Salthouse, Easton Broad, Walberswick to Dunwich and Sudbourne Beach, protecting property, agricultural land and areas of internationally important nature reserves, continue to require significant repairs following tidal damage.

The three Shoreline Management Plans (SMPs) covering the sea defence frontages in Norfolk and Suffolk have all been approved by the Local Flood Defence Committee. The consultants producing the Suffolk Estuaries Strategy have carried out public

SALTHOUSE - NORTH NORFOLK

Shingle bank re-profiling in progress

(Photograph reproduced by kind permission of Mike Page of Strumpshaw)

Clearance of an outfall sluice in Suffolk

Reconstruction of Hollesley Watercourse Sluice, Suffolk, following its failure

consultation during the reporting year and the final plan will be presented to the LFDC for approval in 1999.

Some sea defence highlights:-

Holme-next-the-Sea

The soft dune frontage has been subject to continuous erosion of between 5-10 metres per year. Experimental soft engineering techniques have been constructed to a variety of designs and have proven successful in arresting erosion and accumulating wind blown sand. Their performance is being monitored.

Brancaster

Ahead of the proposed capital scheme and EC Habitats Directive consultations, ongoing emergency works on the deteriorating defence have successfully maintained the existing northern frontage, aided by a benign storm tide season.

Clev to Salthouse

The proposed partial set-back bank remains the preferred capital option to the deteriorating shingle bank. However, approval remains outstanding and the shingle defence has been further degraded by winter onshore wave action. Insufficient shingle remains on the foreshore to allow the defence bank to be re-profiled.

Happisburgh to Winterton

The nine completed reefs and accompanying recharged beach have protected the existing sea wall. However, there remains an urgent need to reinstate failed groynes at identified local frontages under stress, and ongoing monitoring continues to assess the scheme's performance.

There remains a significant revenue commitment to repair and maintain the extensive existing groyne fields between Eccles and Winterton.

Shingle Defences in Suffolk

Annual maintenance works to manage storm damaged shingle banks in Suffolk have been completed as part of our ongoing strategy of maintenance set out in the Suffolk Shoreline Management Plan.

At Aldeburgh the recycling of shingle from Orford Ness to the frontage between Aldeburgh and the Martello Tower has reinforced this depleted updrift frontage.

Between Dunwich and Walberswick the repair of beaches and the reinstatement of the bank profile due to tidal action has been necessary on a number of occasions.

Machine works between Southwold and Easton Bavents have been required to manage the landward retreat of the frontage.

Bawdsey

The completed capital scheme has successfully protected this frontage for the medium term and the Coastal Process Study highlighting preferred management options is awaited.

Felixstowe Ferry

A failing revetment is threatening the Sailing Club and adjacent properties on the seaward side of the retired flood bank. The outcome of the Hollesley - Felixstowe Ferry Coastal Process Study will assist in highlighting options for the future of this frontage.

Tidal Banks and Embankments

Broadland

The condition of the 240km of tidal floodbanks throughout Broadland continues to worsen. Annual settlements of up to 20mm, boat wash and impact damage, leaks and tidal scour all contribute to the need for essential maintenance. Ahead of the Broadland Flood Alleviation Strategy, ongoing maintenance and emergency works are proceeding and additional resources continue to be targeted into Broadland. This revenue work is intended to reduce the accelerated rate of defence deterioration by targeted works and pre-planned maintenance and repairs, to prevent as far as possible the risk of total failure of a tidal bank ahead of the Public Private Partnerships Programme solution.

Emergency works to replace failed piling have been completed on the River Yare at Langley, Reedham Ferry, Haddiscoe Island and Berney Arms.

Suffolk

In Suffolk, repairs to existing rural tidal floodbanks continue, with 67km of estuary defences along the Alde, Deben and Orwell estuaries. These works do not match the worsening condition of the Suffolk estuaries floodbanks. The existing floodbanks protecting the Trimley and Shotley frontages on the Orwell estuary continue to give concern, and following an environmental, economic and hydrodynamic investigation at Shotley, a scheme to recharge the foreshore using dredged material from Harwich Harbour has been successfully completed and is being monitored. The Local Flood Defence Committee agreed that no further work would be carried out on the Trimley frontage.

Consultants working on the Suffolk Estuaries Strategy are producing documents covering the Deben, Alde and Blyth estuaries prior to a public consultation period.

All the tidal defences are inspected annually as part of our ongoing monitoring programme and following a major tidal event. The resulting report and routine frontage inspections assist in the preparation of the Catchment's prioritised revenue and capital programme.

Walberswick Sluice, Suffolk - refurbishment of existing structure

Buxhall Vale Sluice, Suffolk - rebuilding and automation of existing structure

FELIXSTOWE FERRY – SUFFOLK - Failing revetment blockwork

RIVER GIPPING, BLAKENHAM, SUFFOLK
Clearance of intake to Blakenham Lock

Structures

Throughout the Catchment there are more than 450 structures on fluvial and tidal rivers and floodbanks, and incorporated into sea defences, that require operating, maintaining, repair and eventual replacement. The ongoing commitment to meet the operating needs of these structures, whilst complying with current health and safety legislation, requires considerable revenue expenditure. Every significant structure has an operating and maintenance document, and all structures receive safety and maintenance inspections in addition to independent safety audits. Structures that are required to be operated during an emergency, such as floodgates, are regularly tested and receive enhanced levels of inspection and maintenance. Some significant works carried out in 1998/99 are:

- Mendham Mill Sluice, River Waveney: A Revenue Project scheme to automate and renew the existing manual sluice has been completed.

- Bintree Mill Sluice, River Wensum: A Revenue Project scheme to replace an existing vertical lift gate with an automated tilting gate is substantially complete.

- Further automation and upgrading schemes are under way at Hellesdon and Cringleford Mills in Norfolk.

Fluvial Embankments

There are approximately 60km of flood embankments on freshwater sections of Main River in the Catchment, usually above milling heads, where the original function was to impound the river. Routine maintenance continues as required, with selected lengths requiring cutting, leakage repairs and reinstatement works to maintain flood defence standards. Private mill owners are encouraged to manage their water levels sensitively, to prevent either overtopping or drying out of the embankments. Drought conditions lead to lower retained water levels and drying banks, which increases maintenance costs. Following the designation of the River Wensum as an SSSI, a Water Level Management Plan has been prepared in partnership with English Nature which recognises the significant length of embankment and water retained frontages.

The management and operation of retained water levels at both the Environment Agency and privately operated mills continues to be reviewed and refined in the interest of flood defence and the environment.

Pumping Stations

There are three major pumping stations in the Catchment, at Acle, Benacre and Hollesley. In addition, the Catchment administers an Internal Drainage Board pump at Reydon.

- Hollesley Pumping Station: A capital scheme costing £430,000 to replace the former dilapidated structure with an automated station and weed rake has been successfully completed. Significant reductions in revenue costs are anticipated.

- Acle Pumping Station: No major operational problems were encountered during 1998/99. However, the eventual replacement of this station has been highlighted in the Committee's capital Long Term Plan.

- Benacre Pumping Station: The benefits of capital investment in replacement pumps and an automated weedscreen cleaner have been apparent during this first full year of operation.

- Reydon Pump: This floating Agency Administered Internal Drainage Board structure continues to require significant repair and maintenance to ensure adequate operation. The longer term replacement of this station is under investigation.

Weed Control

Using a combination of weedboats, hydraulic machines with grasscutting buckets, flail and pedestrian mowers, and some essential hand cutting, the majority of major watercourses were cut, either once or twice, dependent on need and status of protected area. Chemical methods are not used in our weed control programme.

Previous freshwater flooding events have highlighted the need to target weedcutting, especially on frontages where properties had flooded. On smaller watercourses, especially in Suffolk, this work is still carried out by hand because of difficulties with machine access and the need to preserve our environmental standards.

The timing and extent of weedcutting is discussed with our environmental and fisheries colleagues, particularly on sensitive sections of rivers where fish spawning areas exist. Increasingly, external environmental and fishing organisations influence the weedcutting regime and a balanced decision is required to maintain an effective flood channel whilst protecting conservation interests.

Dredging and Desilting

The programme for fluvial river works has again been driven by previous flooding events, requests from landowners, frontagers and local authorities, and site inspections by staff. In Suffolk, where the watercourses tend to be more reactive and carry a higher silt load, remedial works have been focused on sections of Main River where urban areas have flooded.

Prior to any work commencing, comprehensive liaison is undertaken with all interested parties and agreement sought from the Environment Agency's Fisheries Conservation and Recreation staff. The need to maintain channels to provide flood protection to people and property whilst meeting our statutory requirement to enhance the environment when carrying out these works is an ongoing challenge.

Clearance of Obstructions

There is a continuing need for sensible channel maintenance and the clearance of channel obstructions, weedscreens at pumping stations and sluices, and debris around bridges and structures. Following a major fluvial event, all main rivers in the

St. Benets Abbey, Broadland
Soft engineering techniques being installed to protect tidal river bank
(Sailing wherry *"Albion"* tacking on River Bure)

BURNHAM OVERY SEABANK SLUICE - NORTH NORFOLK
Reconstruction of original 18th Century outfall using traditional finishes

Catchment are patrolled, obstructions removed and landowners advised about fallen trees. In addition, all sluices and structures are regularly visited to remove debris that can reduce the effectiveness of the controls and increase the flood risk.

Urban frontages continue to give problems of discarded debris such as shopping trolleys and vehicles.

Some Key Events in the Year

9-20 April 1998 - Fluvial Flooding Event: An average of 85mm of rain (up to 19 April) fell in Norfolk and Suffolk in April with the 9th being the wettest day. Falling on an already saturated catchment, river levels quickly rose and extensive flooding occurred in both counties. Amber fluvial warnings were issued for river systems with the remaining warnings lifted on the 20th. Agricultural land within flood plains was inundated, several major roads blocked and around 25 properties flooded, mainly due to surface water run-off. However, we were spared the problems of Peterborough and Northampton.

24 April 1998 - Elliot Morley MP, Parliamentary Secretary at the Ministry of Agriculture, Fisheries and Food, visited the North Norfolk coast and, in particular, Sea Palling, Salthouse and Brancaster to gain greater knowledge of our flood defence issues, especially those relating to the implementation of the Habitats Directive in the context of coastal defence.

3 June 1998 - The House of Commons Agriculture Select Committee visited Norfolk for a presentation at the Norwich Catchment Office and an inspection of defences at Sea Palling and Salthouse as part of the review for the future of Flood Defence in England and Wales. The Catchment Engineer gave a presentation on emergency procedures to MPs in the Incident Room.

8 June 1998 - Freak summer down-flows in Norfolk brought chaos to householders and blocked many county roads. 68 Houses were reported flooded due to localised thunderstorms and traffic was disrupted. 44mm of rain were recorded in 30 minutes at Sporle. However, there were no main river problems.

13 June 1998 - Torrential rain swept across Suffolk, with 36mm recorded in 12 hours, resulting in flooding and loss of power supplies. Many main roads in the county were blocked and around 20 properties flooded. This was mainly the result of surface water, with no main river problems.

20 July 1998 - Broadland Flood Alleviation Strategy and PPPP: The

Government raised the Agency's PPPP proposals for Broadland to Pathfinder status. This normally signifies that this project is in line for Government funding and was a key milestone prior to the letting of a formal PPPP contract over 20 years with the Private Sector. This will be the first PPPP initiative to be linked to a major flood defence scheme aimed at protecting the environment.

8 October 1998 - A tidal surge, combined with gale force 8 northerly winds coincided with a predicted spring tide. This resulted in damage to the Norfolk and Suffolk sea defences amounting to £600,000. The recorded tide reached 4.0m AODN at Wells, just under Danger Level, and represented a statistical 1 in 4 year still water return level on the North Norfolk coast. Area and Catchment incident rooms were manned throughout the event and alerts were issued for Divisions 2, 3 and 4. Significant damage occurred to the soft defences, particularly along the North Norfolk frontage, with beach levels being lowered by up to 2.5m at Waxham. At Holme the sand dunes retreated by 2m/3m and at Salthouse the shingle bank was severely damaged, thus highlighting the need for the urgent capital improvement scheme.

23-25 October 1998 - A significant fluvial event affected river systems throughout the Area. Catchment and Area incident rooms were open throughout the weekend to monitor and manage the event. Extensive rain fell on a wet catchment and Yellow and Amber alerts were issued in the two counties. Although extensive areas of agricultural land were flooded, no reports of property flooding from main river were recorded. However, some properties were affected by surface water run-off.

4/5 January 1999 - Gale force north-west winds, combined with a tidal surge of 1.5m, resulted in an Amber tidal alert being issued along the whole of the Norfolk and Suffolk coasts. All flood gates were operated and Area and Catchment incident rooms manned. Significant loss of beach material and overtopping of the weak shingle bank took place at Salthouse, flooding occurred at Oulton Broad and the bank between Walberswick and Dunwich was breached. The tidal event represented a 1 in 1 year return level.

4-17 February 1999 - Numerous Amber tidal alerts were issued for the Norfolk and Suffolk coast. Shingle bank defences at Salthouse and Walberswick were overtopped and high tides in Broadland resulted in leakage to floodbanks.

9-15 March 1999 - A major fluvial event affected all rivers in Norfolk and

Trowse Newton Drain, Norwich
Replacement of failed weir structure incorporating new public access footbridge

EASTON BROAD - SUFFOLK
Construction of water level management structure

Suffolk. Up to 30mm of rain on a saturated catchment raised river levels, with the Wensum, Yare and Waveney all on Amber thresholds. The River Wensum approached Red status at Lyng and significant property was at risk of flooding. However, levels receded without property damage, although large areas of farmland in the counties were flooded as well as roads in the flood plain.

17 March 1999 - The Board of the Environment Agency and the Council for English Nature visited North Norfolk and inspected the Salthouse sea defences. Officers gave a presentation on the proposed capital scheme solution to tidal inundation of the internationally recognised freshwater marshes, coastal main road and properties at Salthouse and Cley. This was followed by a presentation on Brancaster from Professor John Pethick.

Summary of Revenue Maintenance Expenditure in 1998/99

The Norfolk and Suffolk Catchment, in carrying out its revenue expenditure approved by the Local Flood Defence Committee, continues to endeavour to provide value for money within the Authority's financial regulations, whilst achieving a quality level of service and emergency response. The 1998/99 actual expenditure under the various task headings for the Catchment is given below.

-	Sea Defence Works: general maintenance and repairs to 102km of defences.	£	615,547
-	Tidal Banks and Embankments: grass cutting, clearance, damage repairs and revetment replacement to 224km of defences.	£	837,910
-	Structures: routine maintenance, repair and operation of approx. 450 major structures.	£	280,237
-	Fluvial Embankments: the routine maintenance and repair of 60km of non tidal defences.	£	168,749
-	Pumping Stations: the operation, maintenance and power supply to three stations.	£	51,359
-	Weed Control: the cutting and removal of aquatic growth within fluvial main rivers.	£	254,753
-	Dredging and Desilting: removal of silt and vegetation along identified lengths of fluvial main river.	£	65,789

-	Clearance of Obstructions: the removal of debris and obstruction along the whole of the main river system, particularly at bridges and control structures.	£	230,194
-	Emergency Works: the efficient, effective and prompt monitoring of the risk of flooding throughout the Catchment.	£	58,462
		£	2.563.000

EMERGENCY PLANNING

The most significant flood warning event during the year under review was the Easter flood in April 1998. Norfolk and Suffolk were not subjected to the same high rainfall intensities that affected other parts of the country; nevertheless large amounts of rain did fall and Amber Fluvial Flood Warnings were issued across both counties. In Norfolk and Suffolk there was one property on the River Waveney reported as flooded by Main River.

The remainder of the year was comparatively quiet, with several low level, but no major, Tidal and Fluvial Flood Warnings. The Automatic Voice Messaging (AVM), Floodcall and Media warning systems were used on several occasions and performed satisfactorily. Following the Easter floods the Agency set out to review and to improve the flood warning service it offers. Most of the work of the Flood Warning Section during 1998/99 was in response to the Easter floods and the Easter Floods Action Plan. This has severely taxed staff resources and will be partly addressed by a third member joining the team in April 1999.

Discussions between the Norfolk Police and the Agency have concluded with the Police retaining their role to give tidal flood warnings along the coast and in the Broadland area. The Agency will take on and develop a fluvial warning system and in the interim will work jointly with the Police to provide the warnings.

LOCAL ENVIRONMENT AGENCY PLANS

Local Environment Agency Plans (LEAPs) are fully integrated plans covering all areas of interest to the Environment Agency. They have evolved from the Catchment Management Plans instigated by the former National Rivers Authority in 1990, and contain the Agency's additional responsibilities for waste regulation and integrated pollution control. Within the Norfolk and Suffolk Local Flood Defence District there are three such plans - North Norfolk, the Broadland Rivers and East Suffolk.

LEAPs provide a vision for each catchment, together with policies, objectives and actions to achieve overall improvements to the environment. Partnerships with other organisations are keenly sought. The Flood Defence function has an important role in

these plans, alongside all the other functions within the remit of the Environment Agency.

The Broadland Rivers LEAP is currently being re-written prior to public consultation, whilst the North Norfolk and East Suffolk LEAPs have been annually reviewed.

CONSERVATION AND FLOOD DEFENCE

The Norfolk and Suffolk Local Flood Defence Committee has always recognised the effects that many of its works could have on the environment and has taken into account the need to conserve. Before any capital or revenue works are carried out there is full consultation with the conservation interests. Environmental surveys are undertaken and, in the case of major capital schemes, an Environmental Assessment. In addition, Section 7 of the Environment Act 1995 places a positive duty of conservation enhancement upon the Environment Agency: this policy is pursued whenever possible. Agency personnel involved in works are constantly alert to take advantage of unexpected opportunities that often present themselves when plant and workforce are in a particular area, assisted by close links with their conservation colleagues. Where works cannot be justifiably charged wholly to flood defence funds, conservation works using our specialist skills have been undertaken on a rechargeable basis.

The majority of the coast in Norfolk and Suffolk is covered by a range of statutory and non-statutory designations which recognise its national and international environmental importance. There are two statutory designations/directives that recognise the international conservation importance of natural habitats -

- Special Protection Areas (SPA) designated under the European Community Birds Directive for the value of wildfowl and waders.

- Special Areas of Conservation (SAC) designated under the Habitats Directive for the habitats and species value of the area.

In relation to the potential impact of flood defence operations on these sites, the Agency is a Competent Authority with a lead role in ensuring their protection.

Other designations include -

- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- National Nature Reserves (NNR)
- The Broads Authority Environmentally Sensitive Area (ESA)
- Local Nature Reserves (LNR)
- County Wildlife Sites

The need to ensure full liaison and agreement with all consultees prior to working within their designated areas involves a significant but necessary workload and satisfactory forward planning.

The Catchment staff continue to be involved in initiatives to enhance the environment whilst carrying out flood defence works. The following merit particular attention:-

- Alternative and experimental methods of softer engineering: The Catchment have continued their research into softer, cheaper and environmentally sustainable methods of protecting tidal river banks, particularly in Broadland, using trial sites.

- Research and Development Project (R & D): The Environment Agency have published a National R & D project on waterway bank protection. The Catchment have been actively involved on this project and numerous examples in Norfolk are illustrated in this guide.

- Holme-next-the-Sea: A further section of hardwood faggots and chestnut pale fencing has been installed along this eroding dune frontage. Trialling a variety of materials and designs, the results are being monitored to assess performance against more traditional and expensive techniques.

- Hollesley Pumping Station: The construction of an automated replacement station allows improved water level management in the fluvial system. An automatic weed screen also reduces the risk of pollution due to decaying vegetation.

- Framlingham Mere. River Ore: Restoration of Framlingham Mere, a partnership between the Agency, Framlingham College and Suffolk Wildlife Trust continues. The scheme has successfully received £350,000 funding from the Heritage Lottery Fund, the largest scheme in East Anglia. The Mere dates from the 12th Century and in recent years has dried out in the summer months. Work includes deepening the Mere, improving public access, tree management, archaeological investigations and producing a new book about the Mere and the Castle. The works are being undertaken by the Agency's Direct Services Group, having been won in competition with external contractors.

- Burnham Overy sluice: Emergency works were carried out to refurbish this outfall following a structural failure. The opportunity to install a landward water level control structure was taken during construction to allow English Nature enhanced operation of their SSSI reserve at the rear of the structure.

- Broadland - River Bure. Three Mile House: Rand re-creation works have been carried out to protect failing concrete piles and reinstate an original natural habitat feature. These works involve a partnership with English Nature and the Broads Authority, to achieve an environmentally acceptable enhancement with clear flood defence benefits.

- River Yare - Trowse Newton Weir: The major repair of this structure is complete, allowing improved water management at Trowse Mill. In partnership with Norwich Fringe Project a new access footbridge has been incorporated into the structure as part of a new riverside walk, to improve riverside access.

- Easton Broad River: A new water control structure has been completed to enable more positive water level management on this watercourse. The work was carried out in collaboration with the Environment Agency's conservation staff and English Nature and will allow significant environmental improvements to the channel and adjacent habitats, particularly for the bittern.

HOLME-NEXT-THE-SEA - NORTH NORFOLK

Experimental works to sand dunes.

The site of "Sea Henge" is also visible on foreshore

(Photograph reproduced by kind permission of Mike Page of Strumpshaw)

HOLME-NEXT-THE-SEA - NORTH NORFOLK
Installation of experimental soft engineering protection to eroding sand dunes

Flood Defence Partnership Projects

The Catchment continue to promote partnership projects with external agencies where there is an identifiable flood defence and environmental/recreational benefit to the Environment Agency. Some notable projects are:-

LOCATION	PARTNERS WITH ENVIRONMENT AGENCY	DESCRIPTION
Smallburgh Canal	Broads Authority, Landowner	Desilting and general maintenance of main river for navigation and flood defence
River Thurne, Heigham Holmes	National Trust	Combined flood defence wall raising and reed bed rand re-creation works commenced in 1996 with ongoing "fine-tuning"
River Yare, Bramerton	Broads Authority	Experimental "soft-engineered" techniques on tidal reach
River Bure St. Benet's Abbey	Broads Authority, English Heritage, Landowner, Norfolk Archaeology	Feasibility study of combined flood defence works/public access and interpretation of oldest religious site not dissolved by Henry VIII
River Bure, 3-Mile House	Broads Authority (Navigation and Conservation	Combined flood defence/navigation dredging works that encourage environmental enhancement and rand re-creation
River Bure Horstead Mill	Broads Authority English Partnerships Parish Council District Council Heritage Lottery	Creation of public park in Mill area that the Agency control water rights and carry out operational maintenance, extensive access/safety implications
River Waveney, Beccles	Beccles Sailing Club	Combined flood defence and access/safety works at Sailing Club
Sea Palling Offshore Reefs	Sea Palling Volunteer Lifeboat	Facilities at Lifeboat station for telemetry tide and wind indicator equipment

WATER LEVEL MANAGEMENT PLANS

Water Level Management Plans (WLMPs) are a Ministry of Agriculture, Fisheries and Food (MAFF) initiative developed in 1994. The Plans provide a means whereby the water level requirements for a range of activities in a particular area, including agriculture, flood defence and conservation can be balanced and integrated. The *"Conservation Guidelines for Drainage Authorities"* (MAFF/DoE/Welsh Office, 1991) state that WLMPs should be prepared for areas where water levels are managed, the highest priority going to internationally important sites such as Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites.

Within the Norfolk and Suffolk Local Flood Defence District the Environment Agency is currently responsible for the preparation of 19 Water Level Management Plans. These include high profile sites such as Redgrave and Lopham Fens, Minsmere and the North Norfolk Coast. Because the Environment Agency controls the water levels at these sites, it is therefore responsible for preparing their WLMPs. These Plans have been endorsed by English Nature as written agreements. The Plans are treated as working documents and will be reviewed on a regular basis and updated or revised if the objectives are unable to be met or if circumstances change. They also seek to provide continuity and stability for these important sites and, by identifying opportunities, will allow the Flood Defence Committee, in undertaking its statutory duties, to further the conservation of wildlife and the enhancement of natural beauty.

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Soft Engineering

TRIMLEY
the protected land - part arable and part nature reserve

SOFT ENGINEERING

Managed Realignment - Brancaster

Discussions have continued with all the varied local and national interest groups to resolve the problem at Brancaster, where the north sea wall that protects the freshwater marsh to the west of the Royal West Norfolk Golf Club is under threat from the sea's erosion.

Resolution is required to not only find an economic and sustainable solution but also protect the landward Special Protection Area (SPA) freshwater marsh whilst allowing the seaward Special Area of Conservation (SAC) room to migrate landward. This scheme has involved specialist consultants to advise on legal issues, tidal hydrodynamics and environmental impacts and involves considerable staff resource in testing potential solutions.

Do-Nothing - Trimley

There has been an ongoing problem at Trimley where a 2km sea wall has been seriously undermined by wave action destroying the salt marsh and foreshore. Previous work monitored the speed, cause and consequence of this erosion and the placing of 60,000 cubic metres of gravel harbour dredgings to combat the problem. This latter work was undertaken with the co-operation of Harwich Haven Authority and the Ministry of Agriculture, Fisheries and Food. Computer models were also used to establish the "what if?" scenario of the sea wall failing and the 60 hectares affected becoming an unmanaged realignment area.

Because of the low economic value of the protected land - half arable and half undesignated nature reserve - there was no financial justification in the Local Flood Defence Committee permitting public money to be expended in constructing an improved sea defence. As a consequence the sea wall was officially abandoned in the autumn of 1998 and all affected landowners notified.

Future maintenance work is to be undertaken using private finance with the Agency providing ad hoc advice upon request.

Foreshore Recharge - Shotley

The sea wall on the opposite bank of the River Orwell was under a similar threat, the difference being that at Shotley the protected land was designated as a Special Protection Area and the sea wall has a legal maintenance agreement dating from 1954 and still potentially binding. A joint solution was formulated with Harwich Haven Authority and Westminster Dredging by a trial experiment of placing 20,000 cubic metres of silt behind 10,000 cubic metres of gravel bund. The material was from the navigation dredgings to the ports of Felixstowe and Harwich and was provided and placed by HHA at no cost to the Agency. It is hoped to continue and extend this work over the next few years.

ANGLIAN REGION
EASTERN AREA

ENVIRONMENT AGENCY

FORESHORE RECHARGE STRATEGY

HOW IS IT DONE - Gravel dredgings are placed by boat and excavator to form a low bund that is then filled with pumped mud to raise the level.

WHAT ARE THE BENEFITS - A very economic flood defence solution that holds the sea wall in place and provides a rejuvenated mudflat that waders and wildfowl can feed on. It's the estuary equivalent of a human transplant!

Rainfall

The monthly rainfall totals are shown in the following table.

Month	1961-90 Long Term Average (mm)	1998/99	
		Actual (mm)	% Average
April 1998	47	102	217%
May 1998	44	35	80%
June 1998	48	197	410%
July 1998	51	67	131%
August 1998	51	81	159%
September 1998	52	94	181%
October 1998	56	157	280%
November 1998	64	58	91%
December 1998	57	76	133%
January 1999	54	60	111%
February 1999	38	38	92%
March 1999	45	45	124%
Total for year	607	1,010	166%

The long period of below average rainall ended with the year under review. Only three months had below average rainfall, most months being well above average and some considerably above. June 1998 received over four times the long term average.

Soil Moisture Deficit

The year under review began with a low soil moisture deficit In April 1998 but rose steadily through May to August, peaking twice above average at the beginning and very end of September. The SMD then steadily declined to well below average through October to December, remaining fairly stable during January 1999. It began to rise slowly but steadily during February to just above average and started falling back below average during March.

River Flows and Fluvial Events

In April 1998 high flows were experienced around the Easter period but steadily declined towards the end of the month. The river levels once again began to decline steadily during May and remained generally static before making some recovery in August. The heavy rainfall during October caused levels to rise above normal and reach flood conditions late in that month. After the flooding events, river flows remained at normal levels for November. In December steady rainfall and high tides resulted in many Yellow Alerts being issued. High flows prevailed during January, with sporadic bursts. After the normal flows of February, high flows were experienced during the first half of March.

28 Amber and 57 Yellow fluvial flood warnings were issued for Norfolk and Suffolk during 1998/99.

Groundwater Levels

The year under review began with all aquifers showing a slow increase in levels. However, although Norfolk Chalk and Norfolk Drift were at average or above for the time of year, Suffolk Chalk was below the long term minima and Suffolk Crag levels, whilst above the long term minima, were still below the seasonal minima.

All aquifers continued to show a slow increase in levels through April to August but then began to decline, remaining fairly static in September with only small changes. Levels then generally showed a slight rise which continued through to January apart from the Suffolk Crag which showed a moderate fall and remained below average.

During February the Norfolk and Suffolk Chalk rose steadily. The Norfolk Drift and Suffolk Crag fell but remained above average. Throughout March the Norfolk Chalk stabilised and the Norfolk Drift and Suffolk Crag both rose, but the Suffolk Chalk declined.

Storm Tide Warning Service

The Storm Tide Warning Service operated from 1-30 April 1998 and from 1 September 1998 to 31 March 1999. However, the Environment Agency was kept informed of particularly high astronomical tides occurring during the summer months.

5 Amber and 17 Yellow tidal flood warnings were issued for Norfolk and Suffolk during 1998/99.

FINANCIAL REPORT

The following notes apply to the accompanying statement:-

FINAL ACCOUNTS 1998/99 – VARIANCE ANALYSIS

Line Nos.

8. Operating and Management expenditure at £5004k was £21k or 0.42% more than the revised budget. An additional £13k was spent on maintenance and operating works and £8k on administration and general charges.

16. Total income at £9849k was £9k or 0.91% more than the revised budget. The additional income was the result of an increase in investment income.

21. Total capital expenditure was £41k less than the revised budget of £9700k, a variance of 0.42% and the maximum MAFF Grant Income was achieved.

27 Section 47 balances carried forward to 1999/2000 were £961k, £58k more than the revised budget. This represents 6.54% of gross expenditure.

FINAL ACCOUNTS 1998/1999

NORFOLK AND SUFFOLK LOCAL FLOOD DEFENCE COMMITTEE

£000's

Line No		Outturn 1997/98	Revised Budget 1998/99	Outturn 1998/99	Variance
	A. OPERATING AND MANAGEMENT EXPENDITURE				
	Maintenance Works				
1	Main River	853	1091	1097	6
2	Sea Defences	1408	1459	1466	7
3	Flood Warning	67	51	50	(1)
4	Other	155	468	470	2
5	Land and Properties	--	--	--	--
6	Contributions to IDBs	199	160	159	(1)
7	Administration and General Charges	1555	1754	1762	8
8	**TOTAL OPERATING MANAGEMENT EXPENDITURE**	4237	4983	5004	21
9	Revenue Contribution to Capital Outlay	3197	4154	4084	(70)
10	Working Capital	13	30	30	--
11	**TOTAL EXPENDITURE**	7447	9167	9118	(49)
	LESS INCOME				
12	Precepts	7899	8624	8624	
13	General Drainage Charges	789	854	853	(1)
14	Interest Received	291	265	277	12
15	Miscellaneous (including Land Sales)	149	97	95	(2)
16	**TOTAL INCOME**	9128	9840	9849	9
17	**NET SURPLUS/(DEFICIT) TRANSFERRED TO RESERVE**	1681	673	731	58
	B. CAPITAL EXPENDITURE				
18	Grant Aided Works	7112	8125	8359	234
19	Non Grant Aided Works	238	325	155	(170)
20	Capital Salaries/Consultants Fees	1150	1250	1145	(105)
21	Total Capital Expenditure	8500	9700	9659	(41)
	LESS				
22	MAFF Grant	5303	5546	5575	29
23	Capital Contributions	--	--	--	--
24	Revenue Contributions to Capital Outlay (in Section A above)	3197	4154	4084	(70)
	C. RESERVE				
25	i) Balance Brought Forward at 1/4/98	(1451)	230	230	
26	ii) Transfer of Operating Surplus/Deficit	1681	673	731	58
27	iii) Balance Carried Forward to 1/4/99	230	903	961	58
28	Grant Earning Ceiling	7100	7600	7600	
29	Section 47 Balances % of Gross Expenditure	1.80%	6.14%	6.54%	

SECTION 57(1) LAND DRAINAGE ACT 1991

CONTRIBUTIONS TO INTERNAL DRAINAGE BOARDS

Contributions are paid to Internal Drainage Boards for the cost of dealing with upland water flowing into their districts. This method of calculation is regionally standard, having been agreed by all the Local Flood Defence Committees. Contributions for the year ending 31 March 1999 are shown below :

REF NO	INTERNAL DRAINAGE BOARD	TOTAL (£)
NS/1	North Norfolk	1,312
NS/6	River Wensum	25,026
NS/7	Upper Bure	11,393
NS/8	Middle Bure	3,214
NS/9	Lower Bure	2,064
NS/10	Smallburgh	12,049
NS/11	Happisburgh To Winterton	15,702
NS/12	Repps, Martham and Thurne	2,495
NS/13	Muckfleet and South Flegg	16,673
NS/14	Upper Yare and Tas	3,747
NS/15	Lower Yare First	1,855
NS/16	Lower Yare Second	5,930
NS/17	Lower Yare Third	9,171
NS/18	Lower Yare Fourth	2,654
NS/19	Limpenhoe and Reedham	441
NS/20	Langley Chedgrave and Toft Monks	NIL
NS/21	Burgh Castle	2,771
NS/22	Waveney Valley	6,693
NS/23	Lower Waveney	6,389
NS/24	Lower Waveney Second	8,020
NS/25	Lower Waveney Third	(658)
NS/26	Blundeston Flixton and Oulton	2,739
NS/27	Oulton, Carlton Colville and Barnby	1,798
NS/28	Lothingland	NIL
NS/29	River Blyth	6,772
NS/30	Minsmere	427
NS/31	Upper Alde	688
NS/32	Fromus Alde and Thorpness	1,239
NS/33	Middle Alde	2,328
NS/34	River Deben (Upper)	(168)
NS/35	Lower Alde	(208)
NS/36	Alderton, Hollesley and Bawdsey	NIL
NS/37	River Deben (Lower)	15
NS/38	River Gipping	6,767
	TOTAL	159,338
	1998/99 REVISED BUDGET	160,000
	VARIANCE	(662)

FLOOD DEFENCE SCHEMES

SCHEME NUMBER	SCHEME DESCRIPTION	EXPENDITURE '000
A.	GRANT ELIGIBLE EXPENDITURE	
MTA44809	HOLLESLEY PUMPING STATION	412
MTA49012	ARTS PHASE 2	4
MTA49023	ARTS PHASE PHASE 3 BATCH B	75
MTA49034	ATS PHASE 4 BATCH C	24
MTA49044	ARTS PHASE 4 BATCH D	170
MTB40375	SOUTH OULTON BROAD	55
MTB40409	BROADLAND COMP 11 HALVGTE PH 9	874
MTB40506	BROADLAND:REEDHAM/HADDISCOE CUT	688
MTB42003	BROADLAND - STRATEGIC ENVIRONMENTAL	9
MTB42010	BROADLAND - MONITORING	320
MTB40323	BAWDSEY SEA DEFENCES	-1
MTB40330	HOLLESLEY & BAWDSEY SEA DEFENCES	24
MTB40371	WELLS/BURNHAM OVERY IMPS	12
MTB41302	HAPPISBURGH BREAKWATERS PH 1	1,028
MTB41308	HAPPISBURGH / WINTERTON PHASE 2	30
MTB41310	HAPP/WINT (SEA PALL/ECCLES)	56
MTB41314	HAPPISBURGH / WINTERTON - STRATEGIC MON	66
MTB41330	HAPP/WINT INT WORKS	272
MTB41502	CLEY SEA DEFENCES PHASE 2	1
MTB41550	SALTHOUSE FLOOD FROTECTION	49
MTB43000	BROADLAND PPPP/PFI	952
MTB43111	BL COMP 11 - URGENT WKS BREYDON	22
MTB43112	BL COMP 11 - HALVERGATE CONTRACT 2	5
MTB43113	BL COMP 11 - HALVERGATE CONTRACT 3	13
MTB43220	BL COMP 22 - BURGH NORTON STRATEGY	6
MTB43221	BL COMP 22 - FERRY RD/WINDMILL	394
MTB43225	BL COMP 22 - CHET / YARE	1
MTB43350	BL COMP 35 - HADDISCOE ISLAND STRATEGY	10
MTB43351	BL COMP 35 - URGENT WORKS RAVEN HALL	2,101
MTB43361	BL COMP 36 - HUMB FM/CHURCH FM	582
MTB48894	SHORELINE MONITORING - 1997/98	6
MTB48895	SHORELINE MONITORING - 1998/99	99
		8,359

FLOOD DEFENCE SCHEMES

SCHEME NUMBER	SCHEME DESCRIPTION		EXPENDITURE '000
B.	NON GRANT ELIGIBLE EXPENDITURE		
MTA49023	ARTS PHASE 3 BATCH B		12
MTA49034	ARTS PHASE 4 BATCH C		8
MTA49044	ARTS PHASE 4 BATCH D		21
MUD41063	I.D.B.CONTRIBUTIONS 1998/1999		46
MTB40506	REEDHAM / HADISCOE CUT		1
MTB42010	BROADLAND MONITORING		1
MTB40274	R.GIPPING STOWMARKET FLOOD PROTECT		11
MTB40370	FELIXSTOWE FERRY MONITORING		7
MTB40376	HOLME DUNES		2
MTB41308	HAPPISBURGH/WINTERTON PHASE 2		2
MTB41330	WAXHAM/SEA PALLING TOE PROTN		1
MTB41550	SALTHOUSE FLOOD PROTECTION		1
MTB43000	BROADLAND PPPP/PFI		3
MTB43220	BL COMP 22 - BURGH NORTON STRATEGY		3
MTB43221	BL COMP 22 - FERRY RD./WINDMILL		1
MTB43351	BL COMP 35 - RAVEN HALL		2
MUD41996	SEA DEFENCE SURVEY		35
			155
C.	SALARIES	404	
D.	CONSULTANTS	741	1,145
TOTAL CAPITAL EXPENDITURE			9,659