

Environment Agency Anglian Region

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Autumn 2000 Floods Review Regional Report



ENVIRONMENT
AGENCY

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ISBN 185705 567 5

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Cover: Witham washland, November 2000

HO-4/01-150-A Printed on recycled paper

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EXECUTIVE SUMMARY

Flooding affecting Anglian Region between the 27 October and the 30 November 2000 was the most serious flood event since Easter 1998 and in some localities, the most serious for the past 10/15 years. A marked feature of the event was its widespread nature. Almost all main rivers were running at dangerously high levels at some periods during the event and this led to some localised flooding. Flooding of 100 properties occurred at 24 locations, the most serious at Earls Colne and White Colne in Eastern Area where 10 houses were affected.

The Flood Defence scheme which created the Lincoln Washlands was used for the first time to control flooding. The system worked extremely well and undoubtedly saved many properties in Lincoln. It is estimated that 1100 properties would have come under flood water had the scheme not been brought into operation

The region experienced on average double the normal rainfall for the time of year with average accumulations of around 90mm and a maximum of 134mm being recorded in Northern Area. The rainfall pattern saw distinct periods of intense rainfall around the 30th October and the 6th November. Reaction to this rainfall was very swift with levels in watercourses rising rapidly due to run off from the saturated ground.

During the period of the report 9 Severe Flood Warnings, 94 Flood Warnings and 120 Flood Watches were issued. The use of the new 4 stage Flood Warning system, whilst providing better quality information to those at risk of flooding has increased the workload of Incident Room staff, owing to the high numbers of warnings now being issued. This has led to a large increase in administration and to concern that important warnings could be masked among the many Flood Watches which are now issued.

Although not as seriously affected as other regions, up to 115 staff were directly involved staffing Area and Regional Incident Rooms, some operating over 24 hour periods. Almost the entire Direct Services Group (362) was involved in operating and maintaining flood control structures, operating pumping stations and responding to requests for inter-regional aid from other parts of the country. The flooding occurred over a protracted period of time which put existing personnel resources, both staff and Direct Services, under considerable pressure.

Personnel from Anglian Region were deployed on mutual aid in North East Region to inspect flood defences and assist with sandbagging whilst Public Relations staff assisted in Southern and North East Regions. Requests for mutual aid assistance were initially not co-ordinated nationally and most requests were dealt with directly between Regions.

Delivery of filled sandbags from Anglian to other Regions was a 24 hour operation over a 5 day period. Over 24,000 sandbags were shipped by road to North East, Midland and Southern Regions over that period. 11,000 empty sandbags and 1,000 filled sandbags were supplied to Local Authorities in Eastern Area. In all over 35,000 sandbags were filled in Anglian Region during the event.

Public enquiries as a consequence of the flooding were at a high level. In excess of 1000 telephone calls were received by the Regional Communications Centre on 30th October and a combined total in excess of 1000 calls was received over the 6th and 7th November. Area Incident Rooms also reported large volumes of calls; Northern and Central Areas dealing with approximately 1000 external telephone calls and Eastern Area 2000+ during the period of the report.

Well established lines of communication already exist to report on emergency operations. Unexpected demands for additional information, which is often difficult to obtain, deflected operational staff from their main tasks.

The very high resource input into the preparation of post event reports would be considerably reduced if form and content could be firmly established. This would also permit some automatic recording of information during events rather than creating a need to back track to seek out salient facts.

Anglian Region provides a Help Desk facility for the Agency Floodline Service. Over the period of the report 85 calls were dealt with by the Help Desk peaking with 18 calls on the 30th October. At the height of the floods the recorded message service on Floodline dealt with over 68,000 enquiries in a single 24 hour period. It is acknowledged that the availability of Floodline and its recorded message service component, significantly reduced the volume of calls being made to Agency operational centres.

With the ground remaining saturated and continuing unsettled weather it is likely that the Ouse Washes will remain in use as a flood storage reservoir until the spring.

Key Statistics

	Northern	Central	Eastern
Dates Area Incident Rooms Open	30/10/00 to 01/11/00 and 05/11/00 to 12/11/00	30/10/10 to 03/11/00 and 05/11/00 to 10/11/00	29/10/00 to 11/11/00
Staff Working in AIR	30 (5 to 7 on each shift)	45 (3 to 6 on each shift)	40 (3 to 6 on each shift)
Staff Time in AIR	1518 hours	823	930
Number of Calls to AIR	1000+	1000+	2000+

ISSUES ARISING

- a) The introduction of the 4 stage flood warning system provides much greater information to those at risk of flooding, particularly to those receiving information through the media and Floodline. However, the workload for Agency staff has increased considerably as a result.
- b) Staff are now working under considerable pressure to maintain the service requirements and the effect of stress on them during protracted events should be recognised.

- c) Partner Organisations have almost universally commented upon the sheer volume of warnings and other information now being passed to them, particularly at the Flood Watch stage. Concern has been expressed that the volume of warnings could mask, or at least delay reaction to the more important messages.
- d) The agreed information flows between Regions and Head Office are already well established. Additional demands for information outside normal parameters is almost impossible to provide in flood conditions.
- e) There is disproportionate resource input required to produce post event reports where format and content have not been nationally agreed.
- f) Requests to provide Mutual Aid/Inter-Regional Assistance were successfully implemented, but pre-existing Emergency Procedures were not followed initially.
- g) Use of the Lincoln Washlands was a great success; received very positive media coverage and undoubtedly saved many properties in Lincoln from flooding.

RECOMMENDATIONS

- a) The operation of the new 4 stage flood warning system needs to be refined to minimise staff input to its implementation. Following that review there is a need to ensure that staff resources are matched to requirements to deliver.
- b) Measures to minimise and manage staff stress levels should be identified.
- c) Review the triggers for and content of flood warnings messages, particularly the Flood Watch stage. This could be done as part of the review of flood warnings planned for February 2001.
- d) The need for information flows during emergencies needs to be reviewed and reaffirmed.
- e) National standards for post event reporting need to be established.
- f) The national Mutual Aid arrangements within Emergency Procedures needs to be reviewed and to be followed.
- g) Well planned and executed flood alleviation schemes make a positive impact on flood reduction and improve the Agency image with the media and the public.

CHAPTER 1 - INTRODUCTION

At some 27,000 square kilometres and covering one fifth of the area of England and Wales Anglian Region is the largest of the eight Environment Agency Regions. The Region is responsible for 5,800 kms of main river; 1,200 kms being embanked watercourses - with an additional 1,300 kms of tidal flood defences. One fifth of the region lies below sea level. Rainfall levels are the lowest in the country. With so much of the land in the Region low lying and at risk of flooding from rivers and the sea, high standards of flood defences and maintenance are of particular importance.

Local accountability for raising the funds and deciding project priorities, is through Executive Flood Defence Committees.

Anglian Region has a Regional Committee and five Local Committees. All of the Committees have a majority of members who are councillors from County Councils or Unitary Authorities. Other members of the Regional Committee are appointed by MAFF and the non-councillor members of the local committees are appointed by the Regional Committee. Through this structure, local democratically elected councillors have significant inputs to all matters relating to Flood Defence. They have particularly important roles to play in ensuring that the Flood Defence needs in their local authority areas are taken into account, in influencing the availability of funding through local authority levies and in helping to influence planning policies to guide development away from flood risk areas. They are also in a unique position to ensure that the links between local authorities, Flood Defence Committees and the Agency maintain and enhance a seamless and integrated response to flooding.

The majority of expenditure for Flood Defence is provided by County Councils. The remainder is provided by means of grant aid from MAFF, precepts on Internal Drainage Boards (which largely gets funding from District Councils) and from general land drainage charges on occupiers of agricultural land.

This report sets out to catalogue the details of the flooding which occurred in Anglian Region between the 27 October and 30 November 2000 and to distil from it lessons learned and best practice which can be beneficially applied to the management of future events.

The Annex to this chapter sets out a full list of all the issues which need to be considered. The more important of them are further discussed in individual chapters where specific recommendations for implementation are included.

ANNEX A

OCTOBER/NOVEMBER 2000 FLOODS - DEBRIEF ISSUES

1. WHAT WENT WELL

Ref	Issues	Actions/Responsibility
1.1	Particularly in Northern Area, forecasting of peaks and effect of rainfall accurate with good lead-in times	Reinforce through Flood Warning Dissemination Group
1.2	Training of staff in new procedures and doubling up of forecasters at the beginning of the event	Reinforce through Flood Warning Dissemination Group
1.3	Provision of event summaries (using new fax format) well received by RCC and PR	Reinforce through Flood Warning Dissemination Group
1.4	PR support to Areas excellent	
1.5	Good positive media coverage received	
1.6	Good positive reaction from the public both to awareness issues and new Flood Warnings	
1.7	DSG (Direct Services Group) response very good	
1.8	Staff response (in KFH) very good. CIS staff provided ad hoc support roster and volunteered to assist with telemetry and RCC operations	
1.9	Considering number of calls received (60,000+ on one day) Floodline seen to be effective at reducing calls to Agency Incident Rooms. Significant reduction in number of calls from the public as a consequence of the availability of Floodline	
1.10	Lincoln Washlands used for the first time - worked very effectively.	

2. ISSUES FOR IMPROVEMENT

2.1 CIS matters

Ref	Issues	Actions/Responsibility
2.1.1	Lack of confidence in calibration of telemetry instruments. AIR staff unsure of accuracy of readings/alarms. Level checks from gaugeboard readings show wide discrepancies with indicated readings on telemetry.	AFDM (N) to review and make recommendations
2.1.2	Small number of alarms on telemetry delayed before being displayed on screens in RCC or AIR's.	'Systems' being informed of delayed alarms for investigation.
2.1.3	Loss of weather radar on ARTS for some time during the event.	New system currently being planned.
2.1.4	ARTS "running" very slowly at times, possibly caused by staff interrogating ARTS for unnecessarily long periods of time during the event.	(In the short term further ARTS training needed) New system currently being planned.
2.1.5	More ARTS outstations to be considered for improved forecasting particularly in population centres. (Maintenance will become an issue).	Area Flood Defence Managers
2.1.6	Once Area Incident Rooms have opened responsibility for dealing with telemetry alarms moves to the AIR. This has been noted at all recent debriefs with no noticeable improvement.	RCC to monitor to draw specific incidents to attention.
2.1.7	Problems experienced with Agency Trunked Radio System in certain locations. Overcome by use of cellphones by DSG staff.	'Systems'/Direct Services Managers
2.1.8	Difficulty in tracking warnings issued, large in number. Require networked tracking database.	CIS investigating database.

2.1.9	A dedicated network link between Peterborough and Brampton data gatherers would assist telemetry in keeping up a consistent level of performance.	CIS/Systems
2.1.10	Additional training for telemetry system users.	Area Team Leaders Flood Warning /CIS

2.2 Other Equipment Issues

Ref	Issues	Actions/Responsibility
2.2.1	AVM font size very small. Need to investigate increased font size or larger monitors.	National AVM working group
2.2.2	Office equipment, fax machines etc, to be reviewed in RCC and AIRs to ensure equipment is adequate and robust and capable of a high volume through put.	Regional Facilities & Services/Area Business Services Managers
2.2.3	Mapping of wide area flooding by satellite to be investigated.	Emergency Planning
2.2.4	Many offers of equipment are made e.g. pumps, specialist vehicles etc. There is no obvious repository of such information. Should be passed to Areas to add to equipment/resources lists.	ALL

2.3 Flood Warning System

Ref	Issues	Actions/Responsibility
2.3.1	Flood warning faxes too prescriptive. Flexibility needed to cater for locations where only roads at risk with no danger to property and similar issues. Some faxes had to be amended in manuscript.	National Flood Warning Officers Group
2.3.2	Definition of Severe Flood Warning not clear enough. Use of words like "significant" to be avoided.	National Flood Warning Officers Group.

2.3.3	Content of flood warning faxes to be reviewed to identify best practice. Sheer volume of warnings can mask the more important messages. Best practice to be applied consistently throughout the Region.	National Flood Warning Officers Group.
2.3.4	Thresholds for flood warning stages to be reviewed to ensure meeting national criteria.	Area Flood Defence Managers
2.3.5	Review of forecasting criteria for Flood Watch to be carried out by the national project group.	National Flood Warning Centre.
2.3.6	Flood warning stages to be applied consistently with all stages used where a flood warning service is provided.	Area Flood Defence Managers
2.3.7	Area Base Controller (ABC) role not completely adopted. Further training to bring in line with CNFDR required.	Area Flood Defence Managers
2.3.8	Catchment summaries to include all sites with current flood risk. Summaries to be provided (typed, if at all possible) in agreed regional format.	Area Flood Defence Managers
2.3.9	Area situation reports to be provided to RCC by 0600 and 1500 on National template. A further sitrep is required for 0900. If no change since 0600 the 0900 version can be a 'no change' report.	Area Flood Defence Managers
2.3.10	Problems still persist caused by using different names for the same place i.e. parish name and colloquialism.	Area Flood Defence Managers

2.4 Floodline

Ref	Issues	Actions/Responsibility
2.4.1	Floodline system unwieldy to update. Takes too long to record warnings. National script too long. Too long to transfer to public access. Public expect very frequent updates. Very staff resource intensive.	National Floodline Group

2.4.2	Floodline Helpdesk causes increased workload for Anglian RCC and Emergency Planning staff. May need extra resources. Role appears to be expanding.	Emergency Planning
2.4.3	Floodline support required from BT 24 hours a day not just 0630 to 2300 as at present.	National Floodline Group
2.4.4	Floodline Call Centre staff need further training to ensure calls are targeted to the most appropriate office and department. e.g. Gainsborough is in Midland Region.	National Floodline Group
2.4.5	Floodline Call Centre database constructed on Public Face Boundaries. Requires review of database to enable calls to be targeted to Region dealing with any flooding.	National Floodline Group.

2.5 Mutual Support

Ref	Issues	Actions/Responsibility
2.5.1	Consider training of staff in laying of sandbags and other related matters outside normal experience. Photographs of previous work would be helpful.	Regional Flood Defence Manager
2.5.2	Mutual Aid requests not handled well by National Incident Room. Co-ordination of all requests to be through the NIR via RCC and approved by RDO, Area Manager and Regional Director. Standard procedures not followed.	National Emergencies Management Group
2.5.3	Deployment of DSG staff must be flagged to ABC who will keep RCC informed.	Area Flood Defence Managers
2.5.4	DSG is a national resource. Concern over who should decide deployment of personnel nationally to deal with major emergencies.	OMT through NEMG
2.5.5	Personnel returning to region after inter-regional support must report their return to RCC.	Direct Services Managers

2.6 Public Face Issues

Ref	Issues	Actions/Responsibility
2.6.1	Use of terms such as "Bank Seepage" on flood warning faxes to be avoided or given sufficient explanation to prevent unnecessary alarm to the public.	Area Flood Defence Managers
2.6.2	Still receiving demands for sandbags from the public. Need unequivocal statement on whether the Agency does or does not supply sandbags.	OMT
2.6.3	Staff need a set of generic answers to most frequently asked questions from the public/external organisations.	Emergency Planning
2.6.4	Support required for PR at peak times, eg 0600 and 1600 to meet media demand. Support from Areas also needed to deal with local media issues.	Area Managers/Regional Duty Officers
2.6.5	Public Relations to set up lines of liaison with other regions.	Public Relations Manager

2.7 Staff Issues

Ref	Issues	Actions/Responsibility
2.7.1	Skilled staff, particularly Hydrologists, very thin on the ground. Concern about the long hours that current staff are working.	Area Flood Defence Managers
2.7.2	Succession planning for staff with emergency roles and in flood defence positions should be considered.	RMT
2.7.3	New codes have increased the workload of Incident Room staff considerably. More rostered AIR staff may be required. Load should not fall on flood defence/water resources alone.	RMT

2.7.4	Staff stressed and very tired after events. Time must be given to recover. Floods to be seen as a priority. Senior management must demonstrate support for and protect staff during and immediately after events.	RMT
2.7.5	Duty staff should be encouraged to visit flooded areas whenever possible to gain an understanding of events in general.	Area Managers
2.7.6	Staff to man Gold Controls to be identified and undergo further training.	Area Managers
2.7.7	Emergency Work Force availability seriously limited by adherence to Noble numbers. The criteria used to reach Noble numbers is now out of date and the exercise should be repeated in the light of present circumstances.	Regional Management Team
2.7.8	Staff dealing with the public need training in techniques for dealing with angry/aggressive telephone calls.	Personnel
2.7.9	Health and safety and working time issues for staff deployed under inter-regional support is paramount. Training of staff to ensure compliance with legislation is considered to be essential.	Personnel

3 EVENT REPORTING

Ref	Issues	Actions/Responsibility
3.1	The agreed information flows between Regions and Head Office are already well established. Additional demands for information outside normal parameters is almost impossible to provide in flood conditions.	National Emergencies Management Group
3.2	There is a disproportionate resource input required to produce post event reports where format and content have not been nationally agreed.	National Emergencies Management Group

4. FLOOD FORECASTING

Ref	Issues	Actions/Responsibility
4.1	The differences in forecasting methodology and capability across the three Areas are no longer tenable.	Regional Flood Warning Officer
4.2	There is a lack of consistent Region wide modelling.	Regional Flood Warning Officer
4.3	Problems with erratic Met Office forecasts; accuracy fluctuated daily.	National Flood Warning Centre

5. BEST PRACTICE IDENTIFIED

Ref	Issues	Actions/Responsibility
5.1	Use of AVM can be expanded to provide ongoing information and advice. This carried out for Northampton over this event.	Regional Flood Warning Dissemination Group
5.2	In Northern Area the use of the Area Business Manager and team to organise rosters for Incident Rooms, Customer Service teams and provide canteen services is recommended as best practice.	Area Managers
5.3	Agency staff on site should have magnetic Agency signs on private or unmarked vehicles to enhance 'visibility' of the Agency.	Transport
5.4	Regional and National situation reports to be circulated to all AIRs.	RCC
5.5	Target "Are you sure" pop up on AVM screen prior to transmitting messages rather than an unrelated box on the screen.	Area Flood Defence Managers
5.6	ABC in consultation with Emergency Duty Officer (EDO) to compile list of plant and resources available including DSG personnel with specialist skills, on the opening of AIRs.	Area Flood Defence Managers
5.7	Feedback from DSG and partner organisations on properties which have flooded to be encouraged.	Area Flood Defence Managers

5.8	Prior to planned work on structures, banks etc., risk assessment to be completed including preparation of contingency plan for times of increased flood risk.	Area Flood Defence Managers
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CHAPTER 2 - EVENT MANAGEMENT

2.1 INTRODUCTION

Following the Changing Needs of Flood Defence Review (CNFDR) it was agreed that flood monitoring and forecasting would in future be carried out at Regional Offices and flood warning dissemination at Area. Anglian Region is moving to this nationally agreed model but during the period of the report the Regional Flood Monitoring and Forecasting Centre (RFMFC) had not been developed at Region so forecasting, monitoring and flood warning dissemination was carried out in Area Incident Rooms (AIRs). All other roles identified under CNFDR have been adopted throughout the Region and were in operation during this event (but see below with reference to Area Base Controllers).

2.2 PROCEDURES

Following CNFDR and work associated with the introduction of the new Flood Warning Codes on 12 September 2000 all flood warning operational procedures had been revised to take account of the changes. Flood Warning duty staff had undergone considerable training and the value of it was reflected in procedures generally working very well. This was particularly gratifying considering the many changes that had been made, that the new flood warning codes were being used for the first time and additional information updates to the public were needed to be made on the new Floodline recorded message service platform.

Difficulties initially experienced by some staff operating in AIRs were mainly due to lack of experience in performing the new CNFDR roles and coping with changes that had been made to procedures as a result of the new flood warning codes. These difficulties were quickly resolved as experience developed and confidence grew as the event progressed.

The role of Area Base Controller (ABC) is intended to be one of overall event management. This has not been fully implemented in Anglian Region and to become a reality further training is required and new procedures will be needed.

2.3 LIAISON AND COMMUNICATIONS

2.3.1 External Communications

Liaison with external partners has been considerable over the past year particularly through the Local Flood Warning Planning Groups. This included familiarisation training and joint exercising. For this reason familiarity with the meaning of the new codes and translating Agency warnings into appropriate professional responses was well within their capability. However the sheer number of warnings issued, mainly at the Flood Watch stage, caused some difficulty in administration and confident tracking of events. Lines of communication worked well and these will continue to be developed through routine contact and joint exercising.

2.4 GOLD/SILVER CONTROLS

Gold and Silver Controls were activated at a number of locations and Agency staff were present at key times in these controls. Although some strategic external co-ordination took place no Gold Controls were fully operational in the Region. Agency

staff attended for regular meetings with other organisations, Emergency Services, Utilities and Civil Authorities at Joint Service Controls but were not in continuous attendance. (Please see para 6.2)

2.5 STAFF RESOURCES

The Agency response to flooding relies on staff from across a range of functions to assist with flood warning duties. 24 hour operations in incident rooms is very resource intensive and long running flood events require considerable numbers of staff working lengthy shifts to provide adequate cover.

Table 2.5.1 Regional and Area Staff Resource - Event Management

Location	Function	Duties	Number
Peterborough	Flood Warning/ Defence	RCC Manning. Emergency Planning Duty staff.	10
	Public Relations	PR	3(+4 during working hours)
Northern Area	Flood Defence	AIR duties	17
	Water Resources	AIR duties	4
	Env. Protection	AIR duties	1
	Customer Contact	Support	6
	Business Services	Support	2
Central Area	Flood Defence	AIR duties	15
	Water Resources	AIR duties	9
	Customer Services	AIR duties	5
	Env. Planning	AIR duties	5
	FER (Fisheries, Ecology, Recreation)	AIR duties	4
	Regional Flood Def.	AIR duties	2
	Env. Protection	AIR duties	2
	Business Services	AIR duties	2
	Reg. Water Resources	AIR duties	1
Eastern Area	Flood Defence	AIR duties	13
	Water Resources	AIR duties	3
	Env Protection	AIR duties	3
	FER	AIR duties	2
	Customer Services	AIR duties	6
	Business Services	AIR duties	6
	Customer Contact	Support	7
Total			115

Table 2.5.2 Staff Resources - Hours Worked

Head Office/Area		Staff Hours	
Dates		Office Hours	Outside Office Hours
Regional Head Office	30/10 to 15/11	53	260
Northern Area	30/10 to 01/11	120	110
	05/11 to 12/11	392	896
Central Area	30/10 to 10/11	360	463
Eastern Area	29/10 to 11/11	320	610
Totals		1245	2339

2.6 FUNCTIONS EMPLOYED AND INTER-REGIONAL CO-OPERATION

2.6.1 Area Incident Rooms Staffing

AIRs were opened in each Area and remained operational spasmodically for much of the report period. Catchment Incident Rooms opened as required to co-ordinate operational responses and to act as a focus for the Agency in high profile locations such as Northampton. In all, some 115 staff operated in AIRs providing 24 hour cover over the key periods between the 30th October and the 5th /6th of November. The Flood Defence function does not employ the numbers needed to staff AIRs for protracted periods of time. Duty staff come from a range of Agency functions including Water Resources, Environment Protection, FER and Customer and Business Services. This multi-functional support is crucial to providing acceptable management of and effective responses to flood emergencies.

2.6.2 Public Relations

PR staff provided 24-hour cover for media handling during the events in Anglian Region, with a core of three staff handling media enquiries. The team arranged live and recorded radio interviews and written briefings. Other members of the PR team (4 staff) gave additional support during office hours.

In addition, three members of the Anglian Public Relations team provided assistance to Southern Region (Press Officer and Public Relations Manager) and to North East Region (Public Relations Officer) in November.

2.7 TELEPHONE CALLS

Following the Public Awareness Campaign run by the Agency in 1999 and 2000, public expectation on flood related matters has increased considerably. This has led to greatly increased telephone traffic during flood events but there is a consensus of opinion that the existence of Floodline has, to a large extent, protected operational staff from these increases. There is a need to carefully examine the operation of the Floodline call centre to ensure that the maximum number of calls is dealt with there, so that fewer are transferred to the AIRs.

Although complete figures for telephone calls received during the event are not available the following includes estimated call volumes:

Table 2.6.1 Telephone Calls over Key Dates

Location	Number of Calls (approximate)
Regional Communications Centre	Total calls rec'd 30/10/00 1,763 Total calls over report period 11,163. Emergency Hotline: (included in above) Calls rec'd 30/10/00 1,068 Total calls over report period 4,423
Northern Area Incident Room	1000+ over report period
Central Area Incident Room	1000+ over report period
Eastern Area Incident Room	2000+ over report period

2.8 ISSUES ARISING

- a) All recipients of warnings, including those in Agency Incident Rooms, had difficulty in keeping track of the number and status of warnings issued.
- b) Accurate mapping of flooded areas was difficult to achieve without deploying large numbers of staff to sites whilst flooding was at its height.
- c) Offers of resources and plant from external sources were not properly co-ordinated.
- d) The role of Area Base Controller needs to be fully implemented to ensure CNFDR requirements are met completely.
- e) The lack of a standard format for post event reporting of flooding incidents led to disproportionate effort to produce the information needed.
- f) Long hours being worked by Agency staff in stressful conditions needs to be addressed.

2.9 RECOMMENDATIONS

- a) Develop a national event tracking database that links to AVM, Surefax and other dissemination systems, accessible via the Agency network to National Head Office, the National Flood Warning Centre and Regional and Area Offices.
- b) Investigate alternative mapping methods. More use of aerial surveillance or possibly satellite imagery should be considered.
- c) Offers of external resources to be co-ordinated through the National Incident Room.
- d) Review the Area Base Controller role and arrange training for full implementation.
- e) Establish national report formats.
- f) The availability of staff numbers sufficiently trained and experienced to respond to flood events should be reviewed. A complete examination of staff welfare needs when operating in flood conditions is also merited.

CHAPTER 3 - FLOOD FORECASTING

3.1 INTRODUCTION

During the flood event October 27th to November 30th 2000, operational responsibility for flood forecasting lay with the three Area teams based at Lincoln, Brampton and Ipswich. With the formation of a Regional Flood Monitoring and Forecasting team this responsibility will transfer to Region in the future. At the time of the event Regional forecasting and monitoring staff played a supporting role to Areas but did not forecast operationally.

The three Area offices differ considerably in their methods of forecasting flooding. One has real time computer models, one uses the output of a model (non real time) as a basis for forecasting and decision making and one uses only triggers and thresholds and has no modelling capability at all. Regionwide modelling capability will be a considerable and beneficial step forward for flood forecasting in the Region.

As yet there is no Regionwide model in existence, but the new Forecasting and Monitoring Centre is taking a lead role in the development of an Anglian Region Flow Forecasting and Modelling System (AFFMS). This chapter will look at response of each Area separately.

Table 3.1 Details of the Anglian Region Telemetry system performance during the period 27/10/00 and 30/11/00

	Northern Area	Central / Eastern*	Total
Alarms received from outstations	2348	3825	6173
Outstations called via scanning regimes	60,124	78,122	138,246
Outstations called via user update	17,916	19,221	37,137
Total outstations called			175,383
Users logged on during this period	4224	4205	8429

* Central and Eastern Area are on a shared server and therefore the numbers cannot be separated.

Network problems arose 3 times during this period but users were unaware as the secondary machines took over.

A dedicated network link between Peterborough and Brampton data gatherers would assist telemetry in keeping up a consistent level of performance. Sharing the existing network with all other users in the Agency degrades the optimum level of performance.

The telemetry system was very sluggish and slow to respond during some important periods of time. This is almost certainly a consequence of operators leaving 'trend

view' open for unnecessarily long periods of time and to some extent by increasing polling rates and maintaining them over lengthy periods.

Users must be better trained in their appreciation of the consequences of their actions on the system and on other ARTS users.

3.2 REGIONAL OVERVIEW OF WEATHER FORECAST ACCURACY

Table 3.2.1 (All rainfall amounts are in mm)

Date 24hrs	Northern Area		Central Area		Eastern Area	
	Forecast	Actual	Forecast	Actual	Forecast	Actual
28/10/00	<u>11</u>	6	9	9	<u>9</u>	7
29/10/00	<u>15</u>	10	<u>12</u>	32	<u>12</u>	27
30/10/00	<u>35</u>	13	<u>11</u>	5	<u>11</u>	2
31/10/00	<u>10</u>	1	<u>7</u>	2	<u>7</u>	2
01/11/00	<u>2</u>	1	<u>2</u>	3	<u>2</u>	8
02/11/00	<u>1</u>	11	<u>5</u>	14	<u>26</u>	20
03/11/00	<u>1</u>	3	<u>5</u>	8	<u>7</u>	10
04/11/00	<u>25</u>	1	<u>18</u>	5	<u>7</u>	5
05/11/00	<u>15</u>	16	<u>26</u>	22	<u>24</u>	2
06/11/00	<u>8</u>	7	<u>7</u>	32	<u>5</u>	1
07/11/00	<u>9</u>	4	<u>7</u>	5	<u>8</u>	5
	<u>9</u> = over - forecast			<u>7</u> = under - forecast		

3.3 NORTHERN AREA

3.3.1 Accuracy and Timeliness of Met Office Short and Medium Term Forecasts

In Northern Area Met Office forecasts and warnings were generally good. Duty officers felt that they did get sufficient advance warning of heavy rainfall events. See table for comparison of actual and forecast precipitation.

In Northern Area there were no impacts from inaccurate forecasts.

The table below shows the heavy rainfall warnings received from the Met Office affecting Northern Area.

Table 3.3.1 Rainfall Amounts Compared to Met Office Forecasts

Date/Time of issue	Forecast Amount (mm)	Warning period	Actual rainfall in period (mm) (maximum)
27/10/00 13:57	20 to 30	23:00 on 27/10/00 to 21:00 on 28/10/00	12
29/10/00 14:25	Up to 50	15:00 on 29/10/00 to 12:00 on 30/10/00	30
01/11/00 17:49	15 to 25	06:00 on 02/11/00 to 17:00 on 02/11/00	23
05/11/00 08:20	15 to 25 generally Up to 35	15:00 on 05/11/00 to 08:00 on 06/11/00	42
06/11/00 18:32	10 to 20	18:00 on 06/11/00 to 06:00 on 07/11/00	24

Accuracy and Timeliness of Met Office Short and Medium Term Forecasts																
(forecast v actual precipitation)																
	28- Oct	29- Oct	30- Oct	31- Oct	01- Nov	02- Nov	03- Nov	04- Nov	05- Nov	06- Nov	07- Nov	08- Nov	09- Nov	10- Nov	11- Nov	12- Nov
Gauge																
Tathwell	3	10	15	1	0	9	5	0	4	21	10	6	0	3	6	0
Brant Broughton	5	9	11	0	0	6	2	1	17	26	9	2	1	1	8	0
Stamford	6	9	15	1	0	13	1	0	19	19	4	1	1	1	8	1
Barford Bridge	6	11	17	1	1	18	0	0	15	21	4	1	0	1	8	0
Forecast date																
27-Oct	32	14														
28-Oct	11	8	4													
29-Oct		15	35	10												
30-Oct			10	10	14											
31-Oct				10	6	18										
01-Nov					2	15	5									
02-Nov						19	6	2								
03-Nov							1	0	3							
04-Nov								1	10	25						
05-Nov									25	25	8					
06-Nov										8	15	5				
07-Nov											10	9	4			
08-Nov												5	7	2		
09-Nov													5	9	20	
10-Nov														2	15	6

3.3.2 Northern Area Outstation Performance and Reliability

Some telemetry information has been found to be incorrect following comparison with gaugeboard readings and it was discovered that the system required calibrating. Obtaining resources to carry this work out is currently being investigated.

The following sites experienced problems: Bourne Eau Pumping Station, Great Eastern FSR, Wansford Lock Sluice, Raunds Raingauge, Harrowden Gauging Station, Lawyers Sluice Tide Station, Louth, Bardney Raingauge, South Ferriby Sluice, Witham Washlands, Allington, Till Washlands, Fulsby and Hob Hole Tide Station.

3.3.3 Ability of Agency (Northern Area) to predict the actual flood levels using their current models (predicted v actual levels and flows).

Generally it was felt that forecasting for the event was greatly improved over previous events. This was partly due to changes made to the transfer function model and also to the advance notice of the rainfall from the Met Office. The Telemetry system link did not work at the start of the event so telemetry stations had to be direct dialled. This did cause significant delays in providing forecasts, but the link was repaired by the end of the event. It was also very helpful to have representatives from Halcrows working with the Lincoln Washlands Model.

The attached table shows flood forecasts made at key sites using the transfer function model. This model is recognised as being very limited but is useful for estimating the scale of response from recorded and forecast rainfall. The decision to issue a warning is largely based on monitoring with forecast model results providing extra information to help make the decision.

Forecasting likely flooding within the boundaries of Flood Watch, Flood Warning and Severe Flood Warning was achieved successfully and falls within the capabilities of the current flood warning system in place in Northern Area. An important factor was that forecasters were given the necessary space and time to do their job effectively. This was achieved by a deliberate policy decision to provide quiet working conditions where they were freed from personal and telephone interruptions. Ability to forecast floods in Northern Area will greatly improve with the creation of the Regional Flood Forecasting Centre and the development of the state of the art flood modelling system.

PEAK FLOW FORECASTS AT KEY SITES IN NORTHERN AREA

Site	Date/time of forecast		Forecast rainfall	Forecast peak (cumecs)	Actual peak		
					date/time		(cumecs)
Kislingbury Nene - Dodford	06.11.00	01.00	12mm in 6 hours	15.6	06.11.00	15.30	11.5
	06.11.00	05.00	18mm in 18 hours	15.3	06.11.00	15.30	115.
South Bridge - Northampton	30.10.00	04.00	25mm in 6 hours	99	30.10.00	21.15	72.3
	30.10.00	07.00	none	58	30.10.00	21.15	72.3
South Bridge - Northampton	06.11.00	05.00	18mm in 18 hours	78	06.11.00	19.45	65.3
	06.11.00	11.00	none	61	06.11.00	19.45	65.3
Harpers Brook - Islip	06.11.00	01.00	12mm in 6 hours	16.7	06.11.00	10.30	>20
	06.11.00	05.00	18mm in 18 hours	20.3	06.11.00	10.30	>20
Chater - Fosters Bridge	06.11.00	01.00	12mm in 6 hours	7.1	06.11.00	12.00	>19
	06.11.00	06.00	18mm in 18 hours	15.7	06.11.00	12.00	>19
Ancholme - Bishopsbridge	03.10.00	05.00	25mm in 6 hours	14.5	30.10.00	11.15	16.9
Witham - Claypole	06.11.00	07.00	18mm in 18 hours	34.9	06.11.00	21.08	31.1
	06.11.00	11.00	none	26	06.11.00	21.08	31.1

Note - forecast rainfall obtained by telephone contact with London Weather Centre

3.4 CENTRAL AREA

3.4.1 Accuracy and Timeliness of Met Office Short and Medium Term Forecasts

Table 3.4.1 Accuracy and Timeliness of Met. Office Short and Medium Term Forecasts (forecast v actual precipitation)

Gauge	27	28	29	31	1	2	5	6	7	9	10	11	12	23	24	25	26	27
Fleam Dyke	9	9	23	0	0	9	23	12	7	2	1	8	0	6	1	7	0	10
Of Gidding	4	5	28	1	1	13	30	11	6	1	1	3	1	6	1	4	0	10
Drayton Parlow	7	12	46	3	7	17	17	6	2	0	4	6	0	3	2	6	1	10
Brackley	5	8	34	1	4	15	17	3	2	0	5	9	0	2	2	7	0	13
Forecast Date																		
27th	9	33	13															
28th		12	8															
30th				11	18													
31st				7	7	20												
1st					2	12												
5 th							26	22	8									
6th								7	10									
9th										7	11	22						
10th											3	24	10					
23rd														20	10	12		
24th															0	17	5	
25th																12	0	3
26 th																	1	2

The above table shows five separate periods of rainfall that fell during the event, with the amounts that were forecast on the 3-day forecasts at that time. The prediction of rainfall amount was generally about right, although the timing was not always correct 2 days in advance. Updates the following day i.e. 24 hours ahead, usually provided better information, and therefore the forecasts proved useful.

For the most part heavy rainfall warnings appeared on the day as predicted. These were confirmed by radar observations.

The latter two forecasts shown above were not well predicted. There was an over-prediction for the 10th – 12th and the 23rd. The (moderate) amount that fell on the 27th was not well forecast.

Consequences:

Over-predictions led to staff being mobilised (or at least rostered) unnecessarily. For the under-predictions, such was the level of awareness anyway that the staff were able to cope with the un-forecast rain.

Most forecasts were satisfactory and gave a fair estimate of the rainfall to be expected. These were used with STORM (weather radar display software) to predict the timing accurately. Quoted rainfall is for the whole Area, which explains some discrepancies at specific sites.

3.4.2 Central Area Outstation Robustness and Reliability

Outstation reliability was generally good with only limited failures during this period. Where outstations did fail the ability to provide effective forecasts was reduced but this did not result in significant problems as ways were found to overcome the lack of telemetry data. Between 27 October 2000 and 30 November 2000 problems were encountered with the Thornborough Gauging Station and the Leighton Buzzard Gauging Station.

The Thornborough GS is a 'primary' flood-warning site used to provide warnings from Thornborough to Stoney Stratford on the Great Ouse. Following a suspected communications failure, it was off-line during a critical phase of the flood event from 18:00 on 29/10/00 and operations staff were deployed to the site to manually read the gauge level and relay this information to the incident room by telephone. Warnings were issued based on this information.

Leighton Buzzard GS is a 'primary' flood forecasting station on the River Ouzel and although level data was provided continuously for the site, derived flow data was calculated incorrectly on a number of occasions resulting in some confusion but effective forecasting was not compromised.

3.4.3 ARTS Workstation Reliability

A number of significant problems were encountered with the ARTS terminals themselves. The main points are listed below:

- a) There was a general slow down in data retrieval and presentation during the event as demand on the system increased and little could be done to improve this situation.
- b) During the initial phase of the event a telemetry terminal in the control room failed to update mimic trends and trends views for a significant number of level/flow stations and as a consequence the workstation was abandoned in favour of a laptop computer. The laptop performed well but does not carry full functionality, though this was of limited consequence on this occasion.
- c) STORM, the weather radar software, was unreliable, often slow and failing to update pictures when operated on the stand-alone computer and as a consequence was often out-of-action when required.

3.4.4 Ability of Agency (Central Area) to predict the actual flood levels using their current models (predicted v actual levels and flows).

Forecasts of flood levels and times to peaks/thresholds were generally good. A number of methodologies were employed in the provision of flood warnings and together these resulted in generally accurate, reliable and timely forecasts of flood levels in Central Area. The effectiveness of each of the methodologies used is now examined:

- a) The majority of flood warnings in Central Area are based on known relationships between levels at an upstream site and the level/depth of flooding at a downstream risk area. These relationships are based on observation and correlation and form the basis of the majority of the Flood Watch, Flood Warning and Severe Flood Warning thresholds. The provision of flood warnings based on this system worked well during the event.
- b) Using the HEC-HMS hydrological model in a number of upland catchments a series of 'look-up' tables have been produced which relate measured rainfall totals to the level of flooding in downstream risk areas enabling warnings (Flood Warning/Severe Flood Warning) to be issued before the conventional (existing) river level based warnings. This allows a longer lead-time and a more timely warning. The 'look-up' tables were employed following significant rainfall in the catchment of the Alconbury Brook on 05/11/00 and enabled a Severe Flood Warning to be issued 2 hours before the level based alarm triggered.
- c) Additionally, level forecasts were made by comparison with previous high flow events and by using Flood Improvements Feasibility studies where upstream flows have been translated to water level at the risk area. A Flood Improvements Feasibility study for Thetford proved invaluable where combined upstream flows were calculated and could then be translated to flood levels and property flooding in Thetford itself.

The above discussion of methodologies relates to the ability of the present forecasting procedures to forecast Flood Watch, Flood Warning and Severe Flood Warning levels and times to peak. None of the current methods allow for the forecasting of exact levels at a given point in time and space.

Forecasting likely flooding within the boundaries of Flood Watch, Flood Warning and Severe Flood Warning was achieved successfully and falls within the capabilities of the current flood forecasting procedures employed in Central Area. Predicting actual levels for risk areas (and even individual properties) within the existing flood warning thresholds is beyond the capability of the present system employed in Central Area.

3.5 EASTERN AREA

3.5.1 Accuracy and Timeliness of Met. Office Short and Medium Term Forecasts

Table 3.5.1 Accuracy and Timeliness of Met. Office Short and Medium Term Forecasts (forecast v actual precipitation)

Gauge	28	29	30	31	1	2	5	6	9	10	11
Springfield	5.2	0	14.4	2.80	0.40	0.00	0.20	0.20	0.00	0.20	0.20
Coggeshall	6.4	42.4	0	8.00	14.20	24.60	9.20	4.20	1.20	0.40	4.20
Poole Street	4	27.6	0.2	0.40	7.40	15.80	11.0	10.6	1.80	1.00	10.6
Earls Colne	4	30.4	0	0.00	0.00	22.20	8.80	4.20	2.20	0.40	4.20
Kirtling Green	6.4	21	0.2	0.00	10.00	26.20	15.0	7.60	2.40	1.20	7.60
Langham	7.4	39	0.2	1.60	12.00	22.00	14.8	5.40	2.20	0.80	5.40
Bentall	6.4	35	4	0.20	8.80	20.60	9.00	9.20	1.20	1.40	9.20
Needham Market	7.2	30.8	0.4	0.00	11.60	23.80	13.4	4.00	1.60	1.60	4.00
Worlingham	11.2	21.2	0	0.00	9.80	22.00	11.2	2.40	1.80	1.60	2.40
Range	4-11	0-42	0-14	0-8	0-14	0-26	0-15	0-9	0-2	0-1	0-11
Average	6.5	27.5	2.2	1.4	8.2	19.7	10.3	5.3	1.6	0.9	5.3
Forecast Date											
27	28	12									
28	7	9	12								
29		12	35	8							
30			13	14	9						
31				3	7	23					
1					2	12					
2						17					
4							10	25			
5							22	22			
6								9			
9									6	9	24
10										2	27
11											14

The above shows five separate periods of rainfall that fell during the event, with the amounts that were predicted on the 3-day forecasts. The prediction of rainfall amount was generally about right, although the timing was not always correct 2 days in advance. Updates the following day i.e. 24 hours ahead, usually provided better information, and therefore the forecasts proved useful.

3.5.2 Consequences of Inaccurate Forecasts.

As a result of the high confidence given to a forecast of heavy rainfall for the weekend 11th /12th November Eastern area rostered an additional 23 staff to cover duties over that period. When the amounts of forecast rainfall was substantially decreased on the morning of Saturday November 11th rosters were cancelled. The consequences of the inaccurate high forecast caused excessive expense and inconvenience.

3.5.3 Agency Telemetry and Outstation Robustness and Availability.

Eastern area experienced some problems with outstation failures but most of these were resolved within 24 hours by members of the Hydrometric Team. The Regional telemetry system was slow during periods of intense usage but was adequate on the whole.

3.5.4 Ability of Agency (Eastern Area) to predict the actual flood levels using their current models

Eastern area has no fluvial forecast models and relies totally on the use of triggers and thresholds. It relies on the experience of duty officers to interpret events.

3.6 ISSUES ARISING

- a) The differences in forecasting methodology and capability across the three areas are no longer tenable.
- b) There is a lack of consistent Region wide modelling.
- c) Problems with the erratic Met Office forecasts; the accuracy fluctuates daily.
- d) The Anglian Region telemetry system is very dependent on the internal CIS network.
- e) There was some lack of appreciation by telemetry system users of the effect they can have on other system users.
- f) Problems with lack of resources in hydrometry and telemetry teams to maintain and calibrate instruments as regularly as they need, especially as the number of sites is rapidly increasing.

3.7 RECOMMENDATIONS

- a) The establishing of a Regional Flood Monitoring and Forecasting Centre (RFMFC) will ensure that flood forecasting is carried out in a consistent manner.
- b) The RFMFC will also implement a programme of Regionwide modelling.
- c) We need to work more closely with the Met Office to ensure timely and accurate weather forecasts.
- d) A dedicated network link between Peterborough and Brampton data gatherers would assist telemetry in keeping up a consistent level of performance.
- e) Additional training for telemetry system users.
- f) Ways of adequately resourcing the Area Hydrometry Team need to be explored.

CHAPTER 4 - FLOOD WARNING

4.1 INTRODUCTION

During the year 2000 the Agency Flood Warning system had undergone major changes which resulted in the establishment of national standards for Flood Warnings using the new warning stages of Flood Watch, Flood Warning, Severe Flood Warning and All Clear. The introduction of the new four stage warning service has been subjected to a major public awareness campaign targeting properties in floodplains which receive the warning service. In Anglian Region almost 200,000 properties fall into this category and have received direct mailings about the new Flood Warning codes. The new codes came into force on the 12 September 2000 and this was the first flood where the new codes were used

The new codes do not apply everywhere or for every possible type of flooding. Flooding from surface water run-off or burst water mains for example are not covered. The full four stage warning system applies only in locations where the Environment Agency is able to forecast and provide a warning service.

The Flood Watch stage is used to provide warning to a wide geographic area (an entire river catchment or county) and can be targeted to a defined location or predetermined river stretch. A combination of these differently targeted Flood Watches was used to provide advance warning of possible flooding following Met. Office Heavy Rainfall Warnings.

Flood Warnings covering small geographical areas were issued for many locations close to watercourses. The River Great Ouse between Newport Pagnell and St Ives was particularly reactive to the weather and remained at the Flood Warning Level for long periods of time.

Severe Flood Warnings are issued to warn of very serious flood conditions arising where large numbers of people or property would be affected. By its very nature this implies use in urban areas, residential areas or caravan/chalet parks where high concentrations of people are co-located.

Although some Severe Flood Warnings were issued, the largely rural nature of Anglian Region is such that the issue of this level of warning is likely to remain few in number.

4.2 TRIGGERS/THRESHOLDS LEVELS FOR WARNING

Triggers and threshold levels had been reviewed prior to the introduction of the new Flood Warning Codes. The levels were set to provide timely and accurate warnings, but in operational use some need for fine tuning has been identified. Typical of this is the Clipstone Brook where a new gauging station is now being installed to improve forecasts for Leighton Buzzard. Currently this warning is based on water levels in the headwaters of the Ouzel.

Another example is the ford at Hail Weston which is closed to road traffic when a Flood Watch for that area is issued. The current All Clear was found to be set at too high a level and was being issued before the flow had reduced sufficiently. This also

implies that the trigger to initiate Flood Watch could be too high with the warning issued late. A similar situation exists on the Alconbury Brook at the ford in Alconbury Village. All of these issues are being reviewed to arrive at optimum thresholds.

4.3 FLOOD WARNING LEAD TIMES

Throughout Anglian Region flood warning lead times are based on the Customer Charter standard of providing a warning at least 2 hours before the onset of flooding. In general the Anglian lead-time is much greater than 2 hours. Research is required to establish actual lead times across the Region and this work will be carried out as part of a review associated with the Anglian Flow Forecasting & Modelling System which will be introduced over the next two years. The figures given below relate to exceedance of thresholds for locations affected by flooding.

Table 4.3.1 Threshold and Flooding Leadtimes

Date	Time Issued	Gauging Station	River	Threshold (metres)	Time of Threshold Exceedance	Lead Time
30/10/00	0530	Appleford Bridge	Blackwater	1.57	30/10/00 0730	2hrs
30/10/00	0530	Beaches Mill	Can	1.90	30/10/00 0415	12hrs +
30/10/00	0530	Earls Colne	Colne	1.70	30/10/00 1345	8hrs 15mins
30/10/00	0600	Needham Mill	Waveney	1.35	31/10/00 0530	24hrs 30mins
30/10/00	0715	Langham	Stour d/s	1.76	01/11/00 0030	25hrs +
30/10/00	0810	Stowmarket	Gipping	1.30	30/10/00 0930	1hr 20min
05/11/00	1735	Harpers Brook	Harpers Brook	31.70	06/11/00	Approx 12 hrs
06/11/00	0030	Westmill	Stour u/s	1.90	07/11/00 0200	25 hrs
06/11/00	0530	Earls Colne	Colne	1.70	06/11/00 2345	18hrs 15mins
06/11/00	0610	Appleford	Blackwater	1.57	06/11/00 1145	4hrs 35mins
06/11/00	0730	Langham	Stour d/s	1.76	07/11/00 1700	25hrs +
06/11/00	0830	Needham Mill	Waveney	1.35	07/11/00 0145	17hrs 15mins
06/11/00	0830	Farnham	Alde	1.00	06/11/00 1500	6hrs 30mins
06/11/00	0830	Stowmarket	Gipping	1.30	06/11/00 0415	4hrs 15mins
06/11/00	0940	Barford Bridge	Ise	78.5	06/11/00 1615	6hrs 35mins
06/11/00	0955	Beaches Mill	Can	1.90	06/11/00 1400	4hrs 5mins

4.4 FLOOD WARNINGS ISSUED

Over the report period the following Flood Watches, Flood Warnings and Severe Flood Warnings were issued. Flood Watch warnings effectively covered the entire region for much of the event.

Table. 4.4.1 Total Number of Warnings Issued

Warning	Number
Flood Watch	120
Flood Warning	94
Severe Flood Warning	9

4.4.1 Severe Flood Warnings

Table 4.4.2 Severe Flood Warning Details

River	Date	Detail
Nene & Tributaries	30/10/00	Billing Aquadrome, Gogenhoe Mill, Barton Mill, Hardwater Mill
Alconbury Brook	30/10/00	Alconbury, Alconbury Weston, Ellington
Kym	30/10/00	Kimbolton and Stonely
Chelmer	30/10/00	Chelmsford only
Nene	06/11/00	Harpers brook, Willow Brook Thrapston to Yarwell
Ise	06/11/00	Geddington
Chater	06/11/00	Ketton
Alconbury Brook	06/11/00	Alconbury, Alconbury Weston, Ellington
Kym	06/11/00	Kimbolton and Stonely

Details of all Flood Warnings issued are included at Annex A.

4.5 PROPERTY FLOODING

Table 4.5.1 shows details of properties affected by the event:

	Flood Watch Issued	Flood Warning Issued		Severe Flood Warning Issued	
	Properties Flooded	Properties Flooded	Properties Warned but not Flooded	Properties Flooded	Properties Warned but not Flooded
Northern	7	4	777	8	298
Central	24	0	803	0	196
Eastern	44	13	1818	0	0

4.6 METHODS OF WARNING OF FLOODING

4.6.1 Warning Methods

The prime means of issuing direct flood warnings to the public is by the Automatic Voice Messaging System (AVM). This equipment delivers targeted warnings (Flood Warning and Severe Flood Warnings) by telephone, direct to those properties identified as being at greatest risk of flooding. Fax warnings are sent to the media and to our professional partners followed up by direct telephone contact when necessary. Flood Warden systems and self-help groups are operated by some local authorities and Parish Councils in the Region, notably in Central Area at Buckingham, Newport Pagnell, Alconbury, Alconbury Weston, Kimbolton, Stonely, Great Staughton, Hemingford Grey and Mill Quay, St. Ives.

4.6.2 Automatic Voice Messaging System (AVM)

The AVM was used extensively during the report period. The scale of usage is demonstrated by figures from Eastern Area where 9,700 warning calls were made with a success rate of 72%. 2,400 calls were made in the first 9 hours of the event.

4.6.3 Faxes

Issue of warnings to the media and partner organisations is by fax. A suite of nationally agreed standard faxes covers all 4 warning stages with both the media and partners having individual versions. All faxes contain details of locations at risk and have "advice" sections tailored to the appropriate audience. Media faxes provide advice for the public to protect themselves and their property. Partner faxes contain advice that is relevant to implementing emergency plans and making key staff aware of developing situations.

Some faxes include phrases which can lead to undue alarm such as "Bank seepage". This kind of wording is easily misunderstood by the public.

The content of the faxes is biased towards the public and the media and does not fully take into account the different needs of our professional partners. The use and content of faxes to partners should be reviewed to reflect their special needs.

4.7 FLOODLINE

4.7.1 Floodline Performance

The Floodline Service was severely tested by this event with many hundreds of thousands of calls being received by the Floodline Call Centre. The vast majority of these calls was to hear recorded information on the Recorded Message Service (RMS) provided by the Agency for areas where flood warnings were in force. On the 7th November 2000 almost 68,000 calls were made to Floodline of which 58,000 were to hear recorded messages. The Floodline service goes some way to meet the public's expectations and has undoubtedly diverted many public calls away from operational centres.

4.7.2 Recorded Message System (RMS)

The recorded message system is a computer driven voice recording device which holds a multiplicity of warning messages which can be accessed by members of the public by means of the public telephone network. All information on the RMS is recorded in real time by Agency flood warning disseminators using national standard

scripts. The approved script tends to be repetitive, it is rather long and when updates to messages are needed the entire message must be re-recorded. For Areas where many warnings are in force keeping RMS messages up to date is particularly onerous and time consuming. A review of the RMS system and the scripts used by the Agency is required.

4.7.3 Floodline Call Centre

The Floodline Call Centre Operators use a database based on postcodes to determine the most appropriate Region to deal with specific enquiries from the public. The database needs fine-tuning as postcode boundaries do not always match Agency operational boundaries. This sometimes results in telephone calls being transferred from the Floodline Centre to the wrong Region. Northern Area received some 250 such calls which had been misdirected.

4.8 ISSUES ARISING

- a) The content of faxes is more in keeping with the needs of the public and the media, rather than those of the emergency services and other professional partners.
- b) Flood Warning stages, particularly Severe Flood Warning, are not adequately defined.
- c) Uncommon terms such as "Bank Seepage", are used on faxes. These expressions are misunderstood by the public and can lead to confusion and panic.
- d) Operation of the new four stage warning system, generates many more faxes and the need for more intensive management of the RMS.
- e) Operation of the Recorded Message System of Floodline is very staff intensive due to the number of boxes and the need to update messages frequently.
- f) Telephone calls of a general nature are passed to Incident Rooms from the Floodline Call Centre.
- g) Rectification of faults on the RMS platform is not possible between 23:00 and 07:00 as 24 hour support is not available.

4.9 RECOMMENDATIONS

- a) Faxes destined for professional partners need to be redrafted by the National Warning Code Change Team (NWCCT).
- b) Review of categories to be carried out by the NWCCT, to better define the meaning of each.
- c) The content of messages destined for the public would benefit from professional review to introduce plain English.
- d) A review of staff resources to deal with the consequences of introducing the four stage warning system is required.

- e) A review of the structure and operation of the RMS system is required to minimise the AIR staff workload.
- f) Better training Floodline Call Centre Operators required.
- g) 24 hour fault rectification required for the RMS service.

Annex A Flood Warnings Issued

Northern Area Flood Warnings Oct 27 to 30 Nov 2000

Month	Date	Time	Location	WARNING Type
October 2000	27/10/00	14.30	River Nene & Tributaries in Northamptonshire, Cambridgeshire and Peterborough	Flood Watch
	27/10/00	14.30	Rivers Ancholme, Rase and East Coast Rivers in North Lincolnshire, North East Lincolnshire and Lincolnshire	Flood Watch
	27/10/00	14.30	Rivers Welland & Glen in Leicestershire, Rutland and Lincolnshire	Flood Watch
	27/10/00	14.30	River Witham & Tributaries in Lincolnshire	Flood Watch
	30/10/00	19.30	River Glen Surfleet Reservoir High Tide 19.30 to 22.30 30th Oct	Flood Warning
	30/10/00	06.05	River Welland & tributaries Market Harborough to Stamford	Flood Watch
	30/10/00	23.45	River Nene & Tributaries Billing Aquadrome, Cogenhoe Mill, Barton Mill, Hardwater Mill, Wollaston Mill & Whiston	Severe Flood Warning
	30/10/00	09.20	River Ancholme Bishopbridge to South Ferriby	Flood Watch
	30/10/00	10.50	River Nene & Tributaries, Alledge Brook, Harpers Brook and Willow Brook Thrapston to Yarwell	Flood Watch
	30/10/00	11.35	River Ise & Tributaries Clipston to Wellingborough	Flood Watch
	30/10/00	16.10	River Glen & Tributaries and Bourne Eau system Kates Bridge to Surfleet Reservoirs	Flood Watch
	30/10/00	09.40	River Rase A631 at Bishopbridge	Flood Warning
	30/10/00	09.20	River Ancholme, Bishopbridge to South Ferriby	Flood Watch
	30/10/00	14.55	River Nene & Tributaries in Kislingbury	Flood Warning
	30/10/00	16.15	River Ise in Geddington	Flood Warning
	30/10/00	16.45	River Nene & Tributaries Billing to Thrapston	Flood Watch
	30/10/00	10.45	Harpers Brook in Sudborough	Flood Warning
	30/10/00	10.05	River Nene & Tributaries Yarwell to Peterborough	Flood Watch
	30/10/00	03.10	River Rase & Tributaries Market Rasen to Bishopbridge and River Ancholme down to Bishopbridge	Flood Watch
	30/10/00	05.36	River Glen & Tributaries and Bourne Eau system upstream of Kates Bridge	Flood Watch

Month	Date	Time	Location	WARNING Type
October 2000	30/10/00	05.02	River Nene & Tributaries Daventry to Duston	Flood Watch
	30/10/00	06.00	River Witham & Tributaries Claypole to Lincoln	Flood Watch
	30/10/00	14.20	River Witham & Tributaries in Lincoln	Flood Watch
	30/10/00	07.43	Barlings Eau, Stainfield Beck, Tilehouse Beck and Sudbrooke Beck	Flood Watch
	30/10/00	06.21	River Witham & Tributaries South Witham to Lincoln	Flood Watch
	31/10/00	11.55	River Witham & Tributaries Lincoln to Boston	Flood Watch
	31/10/00	07.25	River Nene North Bank Road Tide Lock 10.30-12.30 on 31st Oct	Flood Warning
	31/10/00	13.00	River Nene North Bank Road Tide Lock 21.30 on 31st Nov-01.30 on 1st Nov and 10.30-12.30 on 1st Nov	Flood Warning
	31/10/00	16.37	River Nene & Tributaries Billing Aquadrome, Cogenhoe Mill, Barton Mill, Hardwater Mill, Wollaston Mill & Whiston	Flood Watch
	31/10/00	19.25	River Welland & Tributaries Stamford to Spalding	Flood Watch
November 2000	01/11/00	15.10	River Nene B1040 Thorney to Whittlesey Road	Flood Warning
	03/11/00	14.00	Rivers Ancholme, Rase and East Coast Rivers in North Lincolnshire, North East Lincolnshire and Lincolnshire	Flood Watch
	03/11/00	14.00	River Witham & Tributaries in Lincolnshire	Flood Watch
	03/11/00	14.00	River Nene & Tributaries in Northamptonshire, Cambridgeshire and Peterborough	Flood Watch
	03/11/00	14.00	Rivers Welland & Glen in Leicestershire, Rutland and Lincolnshire	Flood Watch
	05/11/00	09.30	River Nene B1040 Thorney to Whittlesey Road	Flood Warning
	05/11/00	17.35	Harpers Brook in Sudborough	Flood Warning
	05/11/00	17.30	River Nene & Tributaries Weedon, Kislisbury & Bugbrooke Mill	Flood Warning
	06/11/00	12.00	River Rase A631 at Bishopbridge	Flood Warning
	06/11/00	07.20	River Nene, Harpers Brook, Willow Brook Thrapston to Yarwell	Severe Flood Warning
	06/11/00	09.40	River Ise in Geddington	Flood Warning
	06/11/00	11.05	River Ise & Tributaries in Geddington, Kettering, Finedon Mill and Wellingborough	Flood Warning
	06/11/00	12.45	River Ise in Geddington	Severe Flood Warning

Month	Date	Time	Location	WARNING Type
November 2000	06/11/00	16.00	River Nene North Bank Road Tide Lock 03.30 to 05.30 on 7th Nov	Flood Warning
	06/11/00	16.30	River Chater in Ketton	Flood Warning
	06/11/00	04.55	River East Glen in East Glen Valley Edenham and Manthorpe	Flood Warning
	06/11/00	04.30	River Tham in Little Bytham	Flood Warning
	06/11/00	03.45	River West Glen in West Glen Valley, Corby Glen, Creeton, Essendine & A152	Flood Warning
	06/11/00	02.00	River West Glen in Corby Glen & A151	Flood Warning
	06/11/00	09.40	Eye Brook in Caldecott	Flood Warning
	06/11/00	10.45	River Chater in Ketton	Severe Flood Warning
	06/11/00	04.45	River Witham in North Witham	Flood Warning
	06/11/00	15.00	Seepage River Witham and Sincil Dyke at Bargate in Lincoln	Flood Warning
	06/11/00	15.05	Seepage River Witham and Fosdyke Canal and Brayford Pool Lincoln	Flood Warning
	06/11/00	07.19	River Chater in Ketton	Flood Warning
	07/11/00	02.10	River West Glen in Greatford Village	Flood Warning
	07/11/00	04.12	River Ancholme in Brigg	Flood Warning
	07/11/00	09.35	River Nene & Tributaries in Northamptonshire, Cambridgeshire and Peterborough	Flood Watch
	07/11/00	01.35	River Rase A631 at Bishopbridge	Flood Warning
	07/11/00	10.35	River Nene North Bank Road Tide Lock 16.30 to 19.30 on 7th Nov and 04.30 to 07.30 on 8th Nov	Flood Warning
	07/11/00	04.10	River Ancholme Bishopbridge to South Ferriby	Flood Warning
	07/11/00	06.45	River Welland & Tributaries Stamford to Spalding	Flood Warning
	07/11/00	09.15	River Witham & Tributaries Lincoln to Bardney	Flood Warning
	08/11/00	08.00	River Nene North Bank Road Tide Lock 17.30 to 20.30 on 8th Nov and 05.30 to 08.30 on 9th Nov	Flood Warning
	08/11/00	22.00	River Witham & Tributaries Lincoln to Boston	Flood Warning
	09/11/00	09.40	River Nene North Bank Road Tide Lock 18.00 to 21.00 on 9th Nov and 06.00 to 09.00 on 10th Nov, 18.30 to 21.30 10th Nov	Flood Warning

Month	Date	Time	Location	WARNING Type
November 2000	10/11/00	10.05	River Nene North Bank Road Tide Lock 18.30 to 21.30 on 10th Nov, 06.40 to 09.40 on 11th Nov, 19.00 to 22.00 11th Nov, 07.20 to 10.20 on 12th Nov, 19.45 to	Flood Warning
	11/11/00	13.20	Louth Canal & Tributaries Louth to Tetney Lock and Waithe Beck & Tributaries Binbrook to Tetney Lock	Flood Watch
	11/11/00	19.00	River Rase A631 at Bishopbridge	Flood Warning
	11/11/00	13.20	Louth Canal & Tributaries Louth to Tetney Lock and Waithe Beck & Tributaries Binbrook to Tetney Lock	Flood Watch
	11/11/00	13.00	River Rase & Tributaries Market Rasen to Bishopbridge and River Ancholme down to Bishopbridge	Flood Watch
	11/11/00	16.05	Barlings Eau, Stainfield Beck, Tilehouse Beck and Sudbrooke Beck	Flood Watch
	11/11/00	13.00	Humber Tributaries Barton on Humber to Humberston	Flood Watch
	12/11/00	07.10	River Witham & Tributaries Lincoln to Boston	Flood Watch
	13/11/00	13.25	River Nene North Bank Road Tide Lock 20.20 to 23.20 on 13th Nov, 08.40 to 11.40 on 14th Nov, 21.00 to midnight 14th Nov	Flood Warning
	14/11/00	15.45	River Nene North Bank Road Tide Lock 21.00 to midnight 14th Nov, 09.25 to 12.25 on 15th Nov and 21.45 on 15th Nov to 00.45 on 16th Nov	Flood Warning

Central Area Flood Warnings Oct 27 to Nov 30 2000

Month	Date	Time	Location	Warning Type	
October 2000	28/10/00	22:30:00	Alconbury	Flood Watch-On	(Level)
	28/10/00	20:40:00	Hail Weston	Flood Watch-On	(Level)
	29/10/00	07:00:00	Offord Navigation-Closed	Nav.	
	29/10/00	07:20:00	Newport Pagnell to Bedford	Flood Watch-On	(Level)
	30/10/00	08:20:00	Bedford to Offord	Flood Watch-On	(Level)
	30/10/00	12:16:00	Shefford	Flood Warning-On	(Level)
	30/10/00	12:00:00	Thornborough to Stony Stratford	Flood Warning-On	(Level)
	30/10/00	11:52:00	Offord to St. Ives	Flood Warning-On	(Level)
	30/10/00	11:40:00	Bourn	Flood Watch-On	(Rain)
	30/10/00	11:40:00	Potton	Flood Watch-On	(Rain)
	30/10/00	12:24:00	Isleham Navigation	Nav. Closed	
	30/10/00	09:15:00	Alconbury	Severe F W-On	(Level)
	30/10/00	13:30:00	Leighton Buzzard	Flood Warning-On	(Level)
	30/10/00	08:15:00	Buckingham	Flood Warning-On	(Level)
	30/10/00	07:30:00	Towcester	Flood Watch-On	(Rain)
	30/10/00	11:25:00	Fornham St. Martin	Flood Watch-On	(Level)
	30/10/00	12:35:00	Cambridge to Granchester	Flood Warning-On	(Level)
	30/10/00	07:30:00	Brampton	Flood Watch-On	(Rain)
	30/10/00	13:20:00	Blunham to Girtford	Flood Warning-On	(Level)
	30/10/00	08:20:00	Leighton Buzzard	Flood Watch-On	(Level)
	30/10/00	14:20:00	Great Chesterford	Flood Warning-On	(Level)
	30/10/00	14:25:00	Great Chesterford	Update Flood Warning	
	30/10/00	15:35:00	Thornborough to Stony Stratford	Update Flood Warning	
	30/10/00	16:10:00	Sutton Gault Causeway	Flood Watch-On	(Level)
	30/10/00	17:25:00	Alconbury	D/Grade to F Warning	
	30/10/00	19:00:00	Kimbolton and Stonely	D/Grade to F Warning	
	30/10/00	19:10:00	Newport Pagnell to Bedford	Update Flood Warning	
	30/10/00	20:00:00	Blunham to Girtford	Update Flood Warning	
	30/10/00	13:00:00	Shefford	Update Flood Warning	
	30/10/00	04:00:00	Buckingham	Flood Watch-On	(Rain)
	30/10/00	01:25:00	Drayton Parslow	Flood Watch-On	(Rain)
	30/10/00	02:00:00	Rushbrook	Flood Watch-On	(Rain)
	30/10/00	02:40:00	Toddington	Flood Watch-On	(Rain)
	30/10/00	02:40:00	Birchmoor	Flood Watch-On	(Rain)
	30/10/00	02:40:00	Kimbolton and Stonely	Flood Watch-On	(Level)
	30/10/00	02:45:00	Alconbury	Flood Warning-On	(Level)
	30/10/00	08:30:00	Cambridge to Granchester	Flood Watch-On	(Level)
	30/10/00	03:00:00	Newport Pagnell to Bedford	Flood Warning-On	(Level)
	30/10/00	06:50:00	Kimbolton and Stonely	Severe F W-On	(Level)
	30/10/00	04:00:00	Buckingham	Flood Watch-On	(Level)
	30/10/00	04:05:00	Shefford	Flood Watch-On	(Level)
	30/10/00	04:05:00	Great Chesterford	Flood Watch-On	(Level)

Month	Date	Time	Location	Warning Type	
October 2000	30/10/00	04:05:00	Bury St. Edmunds	Flood Watch-On	(Level)
	30/10/00	06:50:00	Grimstone	Flood Watch-On	(Rain)
	30/10/00	03:00:00	Great Gidding	Flood Watch-On	(Rain)
	30/10/00	06:50:00	Foxcote	Flood Watch-On	(Rain)
	30/10/00	04:10:00	Dalham to Cowlinge	Flood Watch-On	(Level)
	30/10/00	06:30:00	Shefford	OHR-On	(Level)
	30/10/00	06:30:00	Arelsey	OMR-On	(Level)
	30/10/00	06:20:00	Earith Village	Flood Watch-On	(Level)
	30/10/00	05:50:00	Bury St. Edmunds	Flood Warning-On	(Level)
	30/10/00	05:25:00	Riseley and Pertenhall	Flood Watch-On	(Level)
	30/10/00	05:25:00	Kimbolton and Stonely	Flood Warning-On	(Level)
	30/10/00	04:50:00	Flitwick	Flood Watch-On	(Rain)
	30/10/00	04:50:00	Elmdon	Flood Watch-On	(Rain)
	30/10/00	06:20:00	Offord to St. Ives	Flood Watch-On	(Level)
	31/10/00	19:50:00	Welney Causeway	Flood Watch-On	(Level)
	31/10/00	16:45:00	Shefford	OHR-Off	
	31/10/00	17:30:00	Bury St. Edmunds	All Clear	
	31/10/00	17:30:00	Buckingham	D/Grade to Watch	
	31/10/00	18:00:00	Leighton Buzzard	All Clear	
	31/10/00	18:30:00	Drayton Parslow	All Clear	(Rain)
	31/10/00	18:30:00	Great Gidding	All Clear	(Rain)
	31/10/00	18:50:00	Alconbury	All Clear	
	31/10/00	23:00:00	Buckingham	All Clear	
	31/10/00	19:20:00	Fornham St. Martin	All Clear	
	31/10/00	10:30:00	Elmdon	All Clear	(Rain)
	31/10/00	16:45:00	Arlesey	OMR-Off	
	31/10/00	18:50:00	Kimbolton and Stonely	All Clear	
	31/10/00	03:05:00	Bury St. Edmunds	D/Grade to Watch	
	31/10/00	16:30:00	Rushbrook	All Clear	(Rain)
	31/10/00	14:00:00	Buckingham	Update Flood Warning	
	31/10/00	03:00:00	Alconbury	D/Grade to Watch	
	31/10/00	03:00:00	Kimbolton and Stonely	D/Grade to Watch	
	31/10/00	12:45:00	Newprot Pagnell to Bedford	Update Flood Warning	
	31/10/00	02:30:00	Leighton Buzzard	D/Grade to Flood Watch	
	31/10/00	14:30:00	Thornborough to Stony Stratford	Update Flood Warning	
	31/10/00	15:30:00	Offord to St. Ives	Update Flood Warning	
	31/10/00	16:30:00	Blunham to Girtford	Update Flood Warning	
	31/10/00	16:30:00	Shefford	D/Grade to Watch	
	31/10/00	16:30:00	Great Chesterford	D/Grade to Watch	
	31/10/00	16:30:00	Toddington	All Clear	(Rain)
November 2000	01/11/00	16:30:00	Welney Causeway	Flood Warning-On	(Level)
	01/11/00	13:05:00	Riseley and Pertenhall	All Clear	
	01/11/00	21:00:00	Offord to St. Ives	Update Flood Warning	
	01/11/00	17:30:00	Cambridge to Granchester	Update Flood Warning	
	01/11/00	16:30:00	Buckingham	All Clear	

Month	Date	Time	Location	Warning Type
November 2000	01/11/00	14:10:00	Grimstone	All Clear
	01/11/00	14:10:00	Great Chesterford	All Clear
	01/11/00	21:30:00	Dalham to Cowlinge	All Clear
	01/11/00	13:00:00	Flitwick	All Clear
	01/11/00	13:00:00	Shefford	All Clear
	01/11/00	13:00:00	Hail Weston	Flood Watch- All Clear
	01/11/00	12:30:00	Birchmoor	All Clear
	01/11/00	08:00:00	Blunham to Girtford	All Clear
	01/11/00	07:00:00	Bedford to Offord	Flood Warning-On (Level)
	01/11/00	06:30:00	Earith Causeway	Flood Warning-On (Level)
	01/11/00	01:00:00	Blunham to Girtford	D/ Grade to Flood Watch
	01/11/00	21:00:00	Bedford to Offord	Update Flood Warning
	01/11/00	13:00:00	Towcester	All Clear
	02/11/00	22:30:00	Shefford	OMR-On (Level)
	02/11/00	14:50:00	Arlesey	OHR-On (Level)
	02/11/00	15:25:00	Alconbury	Flood Warning-On (Level)
	02/11/00	17:45:00	Shefford	Flood Watch-On (Level)
	02/11/00	18:15:00	Drayton Parslow	Flood Watch-On (Rain)
	02/11/00	18:30:00	Newport Pagnell to Bedford	Update Flood Warning
	02/11/00	14:40:00	Alconbury	Flood Watch-On (Level)
	02/11/00	22:20:00	Blunham to Girtford	Flood Watch-On (Level)
	02/11/00	12:00:00	Thetford	Flood Watch-On (Level)
	02/11/00	22:20:00	Blunham to Girtford	OMR-On (Level)
	02/11/00	14:00:00	Hail Weston	Flood Watch-On (Level)
	02/11/00	14:00:00	Arlesey	OMR-On (Level)
	02/11/00	13:15:00	Kimbolton and Stonely	Flood Watch-On (Level)
	02/11/00	09:30:00	Cambridge to Granchester	D/Grade to Flood Watch
	02/11/00	08:30:00	Bourn	All Clear
	02/11/00	08:30:00	Potton	All Clear
	02/11/00	08:30:00	Foxcote	All Clear
	02/11/00	07:30:00	Thornborough to Stony Stratford	D/Grade to Flood Watch
	02/11/00	13:30:00	Isleham Navigation	Nav. Open
	03/11/00	09:00:00	Welney Causeway	Update Flood Warning
	03/11/00	02:25:00	Blunham to Girtford	Flood Warning-On (Level)
	03/11/00	04:30:00	Alconbury	D/Grade to Watch
	03/11/00	08:30:00	Thornborough to Stony Stratford	Flood Warning-On (Level)
	03/11/00	13:45:00	Blunham to Girtford	D/Grade to Watch
	03/11/00	15:10:00	Drayton Parslow	All Clear
	03/11/00	15:15:00	Thetford	All Clear
	03/11/00	16:50:00	Bedford to Offord	Update Flood Warning
	03/11/00	19:30:00	Shefford	All Clear
	03/11/00	20:15:00	Cambridge to Granchester	All Clear
	03/11/00	20:45:00	Alconbury	All Clear
03/11/00	07:30:00	Offord to St. Ives	Update Flood Warning	
04/11/00	13:00:00	Kimbolton and Stonely	All Clear	

Month	Date	Time	Location	Warning Type
November 2000	04/11/00	05:20:00	Blunham to Girtford	All Clear
	04/11/00	13:00:00	Hail Weston	All Clear
	05/11/00	09:30:00	Bedford to Offord	D/Grade to Watch
	05/11/00	10:15:00	Thornborough to Stony Stratford	D/Grade to Watch
	06/11/00	13:50:00	Newport Pagnell to Bedford	Flood Warning-On (Level)
	06/11/00	22:35:00	Kimbolton and Stonely	D/Grade to Warning
	06/11/00	07:45:00	Buckingham	Flood Watch-On (Level)
	06/11/00	08:15:00	Leighton Buzzard	Flood Watch-On (Level)
	06/11/00	10:45:00	Cambridge to Granchester	Flood Watch-On (Level)
	06/11/00	10:50:00	Shefford	OMR-On (Level)
	06/11/00	10:50:00	Shefford	Flood Watch-On
	06/11/00	12:40:00	Fornham St. Martin	Flood Watch-On (Level)
	06/11/00	13:40:00	Great Chesterford	Flood Warning-On
	06/11/00	14:25:00	Blunham to Girtford	OMR-On
	06/11/00	14:25:00	Blunham to Girtford	Flood Watch-On (Level)
	06/11/00	15:40:00	Cambridge to Granchester	Flood Warning-On (Level)
	06/11/00	19:15:00	Blunham to Girtford	OHR-On
	06/11/00	19:15:00	Blunham to Girtford	Flood Warning-On (Level)
	06/11/00	07:13:00	Arlesey	OHR-On (Level)
	06/11/00	22:35:00	Alconbury	D/Grade to Warning
	06/11/00	05:40:00	Arlesey	OMR-On (Level)
	06/11/00	22:45:00	Attleborough	Flood Watch-On (Rain)
	06/11/00	19:20:00	Stanton	Flood Watch-On (Rain)
	06/11/00	02:00:00	Burrough Green	Flood Watch-On (Rain)
	06/11/00	00:00:00	Alconbury	Flood Warning-On (Rain)
	06/11/00	01:10:00	Alconbury	Flood Warning-On (Level)
	06/11/00	01:25:00	Kimbolton and Stonely	Flood Watch-On (Level)
	06/11/00	07:04:00	Alconbury	Sev. F Warning-On (Level)
	06/11/00	01:47:00	Toddington	Flood Watch-On (Rain)
	06/11/00	06:30:00	Bury St. Edmunds	Flood Warning-On (Level)
	06/11/00	02:15:00	Dalham to Cowlinge	Flood Watch-On (Level)
	06/11/00	02:15:00	Great Gidding	Flood Watch-On (Rain)
	06/11/00	02:45:00	Elmdon	Flood Watch-On (Rain)
	06/11/00	03:20:00	Hail Weston	Flood Watch-On (Level)
	06/11/00	03:45:00	Bury St. Edmunds	Flood Watch-On (Level)
	06/11/00	04:10:00	Kimbolton and Stonely	Flood Warning-On (Level)
	06/11/00	04:15:00	Kimbolton and Stonely	Sev. F Warning-On (Level)
	06/11/00	04:22:00	Great Chesterford	Flood Watch-On (Level)
	06/11/00	04:30:00	Newport Pagnell to Sharnbrook	D/Grade to Watch
	06/11/00	04:30:00	Newport Pagnell-Sharnbrook to Bedford	D/Grade to Watch
	06/11/00	05:00:00	Alconbury	Sev. F. Warning-On (Rain)
	06/11/00	03:35:00	Riseley and Pertenhall	Flood Watch-On (Level)
	06/11/00	01:35:00	Rushbrook	Flood Watch-On (Rain)
	07/11/00	04:20:00	Leighton Buzzard	All Clear
	07/11/00	15:50:00	Alconbury	D/Grade to Watch

Month	Date	Time	Location	Warning Type	(Level)
November 2000	07/11/00	14:00:00	Thetford	Flood Watch-On	(Level)
	07/11/00	13:35:00	Shefford	OMR-Off	
	07/11/00	11:20:00	Great Chesterford	D/Grade to Watch	
	07/11/00	08:15:00	Buckingham	All Clear	
	07/11/00	05:40:00	Kimbolton to Stonely	D/Grade to Watch	
	07/11/00	18:45:00	Bury St. Edmunds	D/Grade to Watch	
	07/11/00	05:40:00	Offord to St. Ives	Update Flood Warning	
	08/11/00	23:00:00	Great Gidding	All Clear	
	08/11/00	23:00:00	Burrough Green	All Clear	
	08/11/00	23:00:00	Toddington	All Clear	
	08/11/00	22:20:00	Fornham St. Martin	All Clear	
	08/11/00	05:45:00	Thetford	Flood Warning-On	(Level)
	08/11/00	20:30:00	Shefford	All Clear	
	08/11/00	23:00:00	Rushbrook	All Clear	
	09/11/00	13:35:00	Kimbolton and Stonely	All Clear	
	09/11/00	18:00:00	Riseley and Pertenhall	All Clear	
	09/11/00	12:00:00	Hail Weston	All Clear	
	09/11/00	11:30:00	Bedford to Offord	Flood Warning-On	
	09/11/00	06:00:00	Great Chesterford	All Clear	
	09/11/00	06:00:00	Alconbury	All Clear	
	09/11/00	04:45:00	Newport Pagnell to Sharnbrook	D/Grade to Watch	
	09/11/00	06:00:00	Blunham to Girtford	All Clear	
	09/11/00	21:20:00	Newport Pagnell to Sharnbrook	All Clear	
	09/11/00	11:00:00	Thornborough to Stony Stratford	All Clear	
	10/11/00	11:30:00	Newport Pagnell-Sharnbrook to Bedford	D/Grade to Watch	
	10/11/00		Thetford	Update Flood Warning	
	10/11/00	10:30:00	Cambridge to Grantchester	All Clear	
	12/11/00		Great Chesterford	Flood Watch	
	12/11/00		Hail Weston	Flood Watch	
	12/11/00		Cambridge to Grantchester	Flood Watch	
	12/11/00		Newport Pagnell to Bedford	Flood Watch	
	14/11/00		Thetford	D/G Flood Watch	
	14/11/00		Hail Weston	All Clear	
	14/11/00		Cambridge to Grantchester	All Clear	
	14/11/00		Great Chesterford	All Clear	
	14/11/00		Earith Village	All Clear	
	14/11/00		Offord to St Ives	All Clear	
	14/11/00		Newport Pagnell-Sharnbrook to Bedford	All Clear	
	14/11/00		Newport Pagnell to Sharnbrook	All Clear	
	14/11/00		Attleborough	All Clear	
	14/11/00		Earith Causeway	D/G Flood Watch	
	15/11/00		Earith Causeway	All Clear	
	15/11/00		Thetford	All Clear	
	15/11/00		Dalham to Cowlinge	All Clear	
	23/11/00	21:15:00	Heacham	Flood Watch	(Rain)

Month	Date	Time	Location	Warning Type	
November 2000	25/11/00	08:20:00	Hail Weston	Flood Watch	(Level)
	26/11/00	08:00:00	Newport Pagnell to Bedford	Update Flood Watch	(Level)
	27/11/00	10:00:00	Hail Weston	All Clear	
	27/11/00	10:00:00	Heacham	All Clear	
	28/11/00	08:30:00	Welney Causeway	Update F Warning	(Level)
	28/11/00	12:30:00	Cambridge to Granchester	Flood Warning	(Level)
	28/11/00	09:40:00	Alconbury	D/Grade to Watch	(Level)
	28/11/00	04:20:00	Offord to St. Ives	Flood Watch	(Level)
	28/11/00	09:15:00	Offord to St. Ives	Flood Warning	(Level)
	28/11/00	15:00:00	Alconbury	All Clear	
	28/11/00	08:45:00	Cambridge to Granchester	Flood Watch	(Level)
	28/11/00	07:00:00	Shefford	Flood Watch	(Level)
	28/11/00	06:30:00	Buckingham	Flood Watch	(Level)
	28/11/00	05:00:00	Kimbolton and Stonely	Flood Watch	(Level)
	28/11/00	04:20:00	Hail Weston	Flood Watch	(Level)
	28/11/00	04:15:00	Alconbury	Flood Warning	(Level)
	28/11/00	06:00:00	Great Chesterford	Flood Watch	(Level)
	29/11/00	11:15:00	Great Chesterford	All Clear	
	29/11/00	11:15:00	Buckingham	All Clear	
	29/11/00	11:15:00	Shefford	All Clear	
	29/11/00	14:30:00	Cambridge to Granchester	All Clear	
	29/11/00	17:40:00	Bedford to Offord	Flood Watch	(Level)
	30/11/00	09:45:00	Offord to St. Ives	D/grade to Watch	(Level)
	30/11/00	09:45:00	Kimbolton and Stonely	All Clear	

Eastern Area Flood Warnings 27 Oct to 30 Nov 2000

Month	Date	Time	Location	Warning Type
October 2000	28/10/00	16:30	Deben,	Flood Watch
	29/10/00	08:15	Waveney	Flood Watch
	29/10/00	08:15	Waveney	Flood Watch
	30/10/00	09:10	Bure	Flood warning
	30/10/00	08:00	N Nfk Rivers	Flood Watch
	30/10/00	08:00	Bure	Flood Watch
	30/10/00	08:00	Yare	Flood Watch
	30/10/00	08:00	Wensum	Flood Warning
	30/10/00	08:30	Crouch	Flood warning
	30/10/00	08:10	Deben	Flood Warning
	30/10/00	07:15	Stour d/s	Flood Watch
	30/10/00	08:10	Minsmere	Flood Warning
	30/10/00	06:00	Waveney	Flood Warning
	30/10/00	09:10	Yare	Flood Warning
	30/10/00	09:10	Waveney	Flood Warning
	30/10/00	10:15	Yare	Flood Warning
	30/10/00	17:45	Chelmer (Chelmsford only)	Severe Flood Warning
	30/10/00	08:10	Lothingland	Flood Warning
	30/10/00	03:10	Stour u/s	Flood warning
	30/10/00	02:40	Blackwater	Flood Watch
	30/10/00	02:40	Chelmer	Flood Watch
	30/10/00	02:40	Stour d/s	Flood Watch
	30/10/00	02:40	Roman	Flood Watch
	30/10/00	02:40	Stour u/s	Flood Warning
	30/10/00	03:10	Lothingland	Flood Watch
	30/10/00	07:15	Stour u/s	Flood Watch
	30/10/00	03:10	Stour d/s	Flood Watch
	30/10/00	04:15	Chelmer	Flood Warning
	30/10/00	05:30	Roman	Flood Warning
	30/10/00	05:30	Blackwater	Flood warning
	30/10/00	06:00	Waveney	Flood Warning
	30/10/00	06:45	Wensum	Flood Watch
	30/10/00	03:10	Minsmere	Flood Watch
	31/10/00	16:15	Deben	Flood Watch Downgrade
	31/10/00	16:15	Minsmere	Flood Watch Downgrade

Month	Date	Time	Location	Warning Type
October 2000	31/10/00	07:15	Chelmer (Chelmsford only)	Flood Watch Downgrade
	31/10/00		Colne Barrier – closure	
	31/10/00	16:15	Lothingland	Flood Watch Downgrade
November 2000	01/11/00	19:45	Waveney	Flood Watch Downgrade
	01/11/00	08:20	Stour u/s	Flood Watch Downgrade
	01/11/00	20:10	Blackwater	Flood Watch Downgrade
	01/11/00	19:45	Waveney	Flood Watch Downgrade
	01/11/00	16:00	Chelmer	Flood Watch Downgrade
	01/11/00	08:20	Stour u/s	Flood Watch Downgrade
	01/11/00	08:20	Crouch	Flood Watch Downgrade
	01/11/00	08:20	Roman	Flood Watch Downgrade
	01/11/00	19:45	Wensum	Flood Watch Downgrade
	02/11/00	14:00	Stour d/s	Flood Watch Downgrade
	02/11/00	14:00	Stour d/s	Flood Watch Downgrade
	02/11/00	14:00	Yare	Flood Watch Downgrade
	03/11/00	16:15	Stour u/s	All Clear
	03/11/00	16:20	Lothingland	All Clear
	03/11/00	16:20	Stour u/s	All Clear
	03/11/00	16:15	N Nfk Rivers	All Clear
	03/11/00	07:45	Yare	All Clear
	03/11/00	07:45	Bure	All Clear
	03/11/00	16:15	Bure	All Clear
	03/11/00	07:45	Waveney	All Clear
	04/11/00	11:15	Stour d/s	All Clear
	04/11/00	11:15	Chelmer	All Clear
	04/11/00	11:15	Chelmer	All Clear
	04/11/00	11:15	Roman	All Clear
	04/11/00	11:00	Stour d/s	All Clear
	04/11/00	11:00	Deben	All Clear
	04/11/00	11:00	Minsmere	All Clear
	04/11/00	10:45	Yare	All Clear
	04/11/00	10:45	Wensum	All Clear
	04/11/00	11:15	Blackwater	All Clear
	05/11/00	13:00	Minsmere	Flood Watch
	05/11/00	13:00	N Nfk	Flood Watch
	05/11/00	13:00	Bure	Flood Watch
	05/11/00	13:00	Wensum	Flood Watch
	05/11/00	13:00	Yare	Flood Watch

Month	Date	Time	Location	Warning Type
November 2000	05/11/00	13:00	Deben	Flood Watch
	05/11/00	13:00	Crouch	Flood Watch
	05/11/00	13:00	Lothingland	Flood Watch
	05/11/00	13:00	Waveney	Flood Watch
	05/11/00	13:00	Yare	Flood Watch
	05/11/00	13:00	Chelmer	Flood Watch
	05/11/00	13:00	Blackwater	Flood Watch
	05/11/00	13:00	Roman	Flood Watch
	05/11/00	13:00	Stour d/s	Flood Watch
	05/11/00	13:00	Stour u/s	Flood Watch
	05/11/00	13:00	Stour d/s	Flood Watch
	05/11/00	13:00	Stour u/s	Flood Watch
	05/11/00	13:00	Bure	Flood Watch
	06/11/00	07:48	Waveney	Flood Warning
	06/11/00	08:30	Lothingland	Flood Warning
	06/11/00	16:00	Yare	Flood Warning
	06/11/00	09:55	Chelmer	Flood Warning
	06/11/00	07:30	Stour d/s	Flood Warning
	06/11/00	07:53	Stour d/s	Flood Warning
	06/11/00	08:30	Deben	Flood warning
	06/11/00	08:30	Waveney	Flood Warning
	06/11/00	03:00	Stour u/s	Flood Warning
	06/11/00	09:33	Wensum	Flood warning
	06/11/00	06:10	Blackwater	Flood Warning
	06/11/00	05:30	Roman	Flood Warning
	06/11/00	03:00	Stour u/s	Flood Warning
	06/11/00	08:30	Minsmere	Flood Warning
	08/11/00	17:40	Yare	All Clear
	08/11/00	18:45	Chelmer	Flood Watch Downgrade
	08/11/00	18:45	Blackwater	Flood Watch Downgrade
	08/11/00	18:45	Stour u/s	Flood Watch Downgrade
	08/11/00	16:20	Minsmere	Flood Watch Downgrade
	08/11/00	16:20	Lothingland	Flood Watch Downgrade
	08/11/00	17:40	Bure	All Clear
	08/11/00	17:40	Waveney	All Clear
	09/11/00	13:20	Deben	Flood Watch
	09/11/00	09:17	Waveney	Flood Watch
	09/11/00	09:17	Yare	Flood Watch

Month	Date	Time	Location	Warning Type
November 2000	09/11/00	09:17	Bure	Flood Watch
	10/11/00	11:00	Waveney	Flood Watch Downgrade
	10/11/00	10:36	Waveney	Flood Watch Downgrade
	10/11/00	11:00	Roman	Flood Watch Downgrade
	12/11/00	07:45	Stour u/s	Flood warning
	12/11/00	07:45	Stour u/s	Flood Warning
	12/11/00	07:45	Roman	Flood Watch Downgrade
	13/11/00	08:45	Bure	All Clear
	13/11/00	08:45	Stour d/s	Flood Watch Downgrade
	13/11/00	08:45	Stour u/s	Flood Watch Downgrade
	13/11/00	08:45	Minsmere	All Clear
	13/11/00	08:45	Wensum	Flood Watch Downgrade
	13/11/00	08:45	N Nfk Rivers	All Clear
	13/11/00	08:45	Waveney	All Clear
	13/11/00	08:45	Bure	All Clear
	13/11/00	08:15	Crouch	All Clear
	13/11/00	08:15	Chelmer	All Clear
	13/11/00	08:15	Roman	Flood Watch
	13/11/00	08:15	Stour d/s	Flood Watch
	13/11/00	08:15	Stour u/s	Flood Watch
	13/11/00	08:45	Colne Barrier – Man	Flood Watch
	13/11/00	08:45	Yare	All Clear
	13/11/00	08:45	Lothingland	All Clear
	14/11/00		Thameside Barriers - Manning	
	14/11/00	16:15	Blackwater	All Clear
	14/11/00	16:15	Roman	All Clear
	14/11/00	10:30	Stour d/s	All Clear
	14/11/00	10:30	Stour u/s	All Clear
	14/11/00	10:30	Stour d/s	All Clear
	14/11/00	10:30	Stour u/s	All Clear
	14/11/00	09:15	Yare	Flood Watch Downgrade
	14/11/00		Colne Barrier - Manning	
	14/11/00	10:30	Deben	All Clear
	15/11/00	08:45	Waveney	All Clear
	15/11/00	08:45	Waveney	All Clear
	15/11/00	08:45	Wensum	All Clear
	15/11/00	08:45	Yare	All Clear

CHAPTER 5 - EVENT IMPACT

5.1 INTRODUCTION

This flood event was notable across the country for its severity and that it impacted in some way on all of the Agency Regions. The consequences in Anglian Region were not severe, even though it was prolonged and widespread. There was minimal disruption to rail and road communications.

All three Areas of the Anglian Region were affected.

5.2 EVENT HYDROLOGY

5.2.1 Rainfall

Rainfall totals for selected gauges in each of the three Areas can be found in the tables below.

Return periods for selected sites have also been calculated. Between 29th October and 12th November 134mm rain fell at Ludford in the Lower Witham Catchment. This equates to a 1 in 35 year return period. In Eastern area the highest return period was a 1 in 7 year event measured at Coggeshall in North Essex. In Central Area a 1 in 4 year event occurring at Rushbrook where 37mm rain fell in an 18 hour period.

5.2.2 River Flows

The severity of the flood peaks are shown in the hydrographs in Annex 5A and in tables relating to each Area.

NORTHERN AREA

Peak levels and flows for flood event - 29 October to 12 November 2000

Welland Catchment Sites	Head metres	Level modn	Flow cumecs	Date	Time	Additional Information
Market Harborough	1.337	76.737		06.11.00	09.45	
Market Harborough- Kettering Rd Bridge	1.506	75.826		06.11.00	09.00	
Jordan	1.137	76.437	12.492	06.11.00	06.00	Estimated non modular flow
Eyebrook	1.078	56.578	24.019	06.11.00	13.30	
Ashley	2.879	58.579		06.11.00	18.30	Previous historic maximum = 58.478 modn in April 1998
Tixover		33.402	97.043	07.11.00	07.15	Estimated return period = 25 years
Fosters Bridge	1.822	40.222		06.11.00	12.00	Out of range for flow measurement Previous historic maximum = 40.07 modn in August 1980
Tallington Main Weir	1.458	14.558	80.334	07.11.00	17.15	
Lolham Mill Stream			0.399			
West Deeping Mill Stream			0.37			
TALLINGTON TOTAL			81.103			Estimated return period = 18 years

Lower Witham Sites	Head metres	Level modn	Flow cumecs	Date	Time	Additional Information
Fiskerton u/s		4.164		09.11.00	00.45	
Fiskerton d/s		4.159		09.11.00	00.45	
Bardney		4.036		09.11.00	01.30	Estimated return period = 6 years
Langworth	2.827	6.357	21.4	11.11.00	23.30	
Stainfield Beck	0.842	8.842	8.5	07.11.00	04.03	Estimated non modular flow
Goulceby	0.544	52.794	4.389	07.11.00	07.45	Estimated return period = 5 years
Victoria Mill	0.924	28.924	9.212	07.11.00	03.45	
Banks Road	0.827	27.477	5.72	07.11.00	01.30	Maximum recorded flow at 02.15 on 07.11.00
Kirkby on Bain		13.677		07.11.00	05.45	
Heightington Beck	0.264	6.764	0.998	11.11.00	12.15	Estimated return period = 8 years
Dunston Beck	0.439	15.489	1.636	12.11.00	04.15	
Billingham		3.413		09.11.00	06.30	
Leasingham	0.457	8.702	3.006	16.11.00	06.15	Estimated return period = 6 years
Grand Sluice		3.152		10.11.00	05.30	
Billingsborough-Ousemere Lode		8.597		06.11.00	09.30	
Swaton		4.61		06.11.00	08.30	
Donington Bridge		2.091		06.11.00	18.30	
Rippingale		2.579		06.11.00	18.30	
Cowbridge		0.955		08.11.00	06.15	
New York		2.305		30.10.00	08.30	
Hagnaby Beck Weir	0.531	1.481		30.10.00	11.45	

Upper Witham and Lincoln Sites	Head metres	Level modn	Flow cumecs	Date	Time	Additional Information
North Witham		95.6		06.11.00	07.00	
Colsterworth	1.071	86.014		06.11.00	08.00	Out of range for flow measurement
Saltersford	0.601	58.306	4.01	08.11.00	19.00	
Claypole	0.933	17.837	31.065	06.11.00	21.08	Estimated return period = 16 years
Brant Broughton	1.663	9.563		06.11.00	10.30	Out of range for flow measurement
Horseshoe Bridge		7.599		06.11.00	14.08	Previous historic maximum = 7.22 modn
Witham Washlands		6.687		06.11.00	16.24	
Hykeham Bridge		6.427	36.977	06.11.00	16.00	Maximum recorded flow at 17:50
Bracebridge		5.967		06.11.00	19.45	
Bargate		5.518		07.11.00	12.45	Estimated return period = 6 years
Monson Street		4.757		07.11.00	20.45	
Squires Bridge		7.121		07.11.00	05.30	
Odder Bridge		5.65		07.11.00	12.00	
Fosdyke-Golf Course		5.435		07.11.00	12.45	
Fosdyke-British Waterways		5.393	28.9	07.11.00	12.45	Maximum recorded flow at 04:45 on 08.11.00
Brayford Pool		5.295		07.11.00	12.45	Estimated return period = 8 years

Ancholme and East Coast Sites	Head metres	Level modn	Flow cumecs	Date	Time	Additional Information
Market Rasen		23.295		11.11.00	16.30	
Ancholme at Bishopbridge	1.027	4.834	16.951	30.10.00	11.15	Estimated return period = 32 years
Rase at Bishopbridge	1.654	5.709		07.11.00	04.15	Non modular flow
Brandy Wharfe		3.255		08.11.00	05.45	
Brigg		2.676		08.11.00	04.45	Estimated return period = 14 years
Lacey Beck	0.695	6.995	3.558	06.11.00	10.45	
Brigsley	0.851	16.548	4.087	07.11.00	01.15	Estimated return period = 10 years
Lud at Louth	0.483	15.903	3.422	07.11.00	01.00	Estimated return period = 3 years
Claythorpe	0.556	7.139	3.581	07.11.00	06.15	Estimated return period = 2 years
Bilsby	1.127	2.097	4	07.11.00	05.00	Maximum flow recorded at 03.05 on 07.11.00
Partney	0.728	15.681	6.414	07.11.00	04.15	Estimated return period = 2 years
Burgh Sluice		2.393		30.10.00	08.30	

Glen Sites	Head metres	Level modn	Flow cumecs	Date	Time	Additional Information
Burton Coggles	1.787	62.587		06.11.00	07.15	
Little Bytham	0.609	38.609		06.11.00	06.45	
Irnham	1.617	44.217		06.11.00	08.30	
Shillingthorpe	1.391	15.191	11.07	07.11.00	02.45	Maximum recorded flow at 22.45 on 06.11.00
Manthorpe	1.548	17.148		07.11.00	01.45	
Kates Bridge	1.339	6.971	22.8	07.11.00	08.15	Maximum recorded flow at 07.00 on 07.11.00
King Street	0.683	9.537	7.429	07.11.00	04.45	
GLEN TOTAL			30.229			Estimated return period = 8 years

Nene Sites	Head metres	Level modn	Flow cumecs	Date	Time	Additional Information
Surfleet Reservoir		2.802		09.11.00	04.24	
Dodford	1.394	80.594	11.539	06.11.00	15.30	
Weedon		79.304		30.10.00	11.45	
Upton Mill	0.997	62.397	4.372	06.11.00	22.45	
Upton Bypass	0.839	62.639	9.77		22.45	
UPTON TOTAL			14.142			Gauging station bypassed at high flows
Brixworth	1.669	84.169		06.11.00	08.15	
St Andrews Mill	1.222	60.522	6.294	06.11.00	18.30	
St Andrews Bypass	1.287	60.887	23.4	06.11.00	18.30	
ST ANDREWS TOTAL			29.694			
South Bridge		57.672	72.3	30.10.00	21.15	Estimated return period = 3 years Maximum recorded flow at 22.10 on 30.10.00
Barford Bridge	1.893	78.693		06.11.00	13.00	
Slade Brook	0.884	57.084	9.827	06.11.00	04.15	
Weldon		85.307		06.11.00	09.00	
Harpers Brook	1.892	32.292		06.11.00	10.30	Out of range for flow measurement
Islip		28.839		08.11.00	17.45	
Lilford		23.548		08.11.00	14.45	Estimated return period = 5 years
Wansford		9.6	76	07.11.00	12.00	Estimated return period = 4 years Maximum recorded flow at 13.45 on 07.11.00

LINCOLNSHIRE CATCHMENT**SITE SPECIFIC RAINFALL DETAILS FOR FLOOD EVENT 29 /10/00 TO 12 /11/00**

Site	First Pulse Start 29 Oct 2000			Second Pulse Start 5 Nov 2000			Third Pulse Start 5 Nov 2000			Total Period 29 Oct to 12 Nov 2000	
	Duration (hrs)	Amount (mm)	Return Period (yrs)	Duration (hrs)	Amount (mm)	Return Period (yrs)	Duration (hrs)	Amount (mm)	Return Period (yrs)	Amount (mm)	Return Period (yrs)
Ancholme and East Coast Sites											
Cadney	16	23.0	1.07	15	19.5	1.01	67	53.0	3.0	96.0	8.5
Toft Newton	13	33.5	2.80	15	20.0	1.01	67	53.5	3.8	105.5	19.9
Ferriby Sluice	23	23.0	1.01	15	30.5	1.77	66	74.5	12.6	121.0	38.0
Goxhill	17	19.8	1.00	16	25.4	1.14	67	69.2	8.7	108.8	22.3
Keelby	15	27.0	1.00	15	28.0	1.29	64	66.0	5.7	123.0	33.0
Laceby	15	28.0	1.30	15	23.6	1.06	68	68.0	6.6	115.6	24.2
Covenham	15	25.0	1.07	15	24.0	1.04	67	61.0	4.0	118.0	22.1
Raithby	17	22.0	1.00	14	22.5	1.00	68	54.0	1.7	100.0	5.5
Tathwell	16	24.4	1.02	15	14.4	1.00	69	39.2	1.0	89.2	3.9
Ulceby Cross	17	25.6	1.08	15	20.6	1.01	69	52.4	2.2	103.4	10.6
Burgh Sluice	15	14.0	1.00	14	8.5	1.00	68	31.0	1.0	61.5	1.2
Upper Witham Sites											
Upton	15	28	1.71	15	24.5	1.28	64	57.0	4.9	106.5	18.8
Brant Boughton	17	18.5	1.00	16	32.5	2.09	-	-	-	87.5	5.1
South Witham	16	22.5	1.02	14	35.5	2.37	-	-	-	92.5	5.3

Lower Witham Sites											
Benniworth	15	25.5	1.13	14	25.50	1.16	68	69.5	6.5	126.5	34.0
Ludford	16	28	1.20	14	30.00	1.45	68	59.0	3.3	134.0	35.0
Stenigot	14	18.5	1.00	14	20.50	1.00	68	54.5	2.1	96.0	5.4
Baumber	14	17	1.00	15	21.00	1.02	69	46.0	1.6	84.5	4.9
Belchford	15	21	1.00	15	20.50	1.00	68	51.5	1.8	98.5	6.4
Guthram Gowt	15	22	1.03	15	31.80	2.25	-	-	-	84.5	7.5
Donington Bridge	16	17.8	1.00	16	27.40	1.36	-	-	-	75.0	3.5
Boston Grand Sluice	16	16.8	1.00	14	16.00	1.00	61	34.8	1.1	67.4	1.9
Osbourmby	16	19.4	1.00	16	26.40	1.15	-	-	-	78.4	2.8
Dunsby	14	22.4	1.04	15	29.80	1.49	-	-	-	86.4	7.0

CENTRAL AREA**Central Area Flow Return Periods for Key Sites**

Gauging Site	River	Peak Flow (m^3s^{-1}) (or level where indicated)	Date	Time	Return Period (years)
Cappenham	Tove	30.49	30/10/00	20:45	Not calculated
Newport Pagnell (Main)	Ouse	65.88	31/10/00	15:30	Not calculated
Willen	Ouzel	27.18	30/10/00	18:30	Not calculated
Bedford	Ouse	106.00	02/11/00	12:44	4
Tempsford	Ouse	94.59*	03/11/00	04:45	5
Arlesey	Hiz	4.29*	30/10/00	15:00	3
Shefford	Flit	13.87	31/10/00	03:15	Not calculated
Blunham	Ivel	22.30*	31/10/00	07:30	3.5
Hail Weston	Kym	19.38	30/10/00	18:00	Not calculated
Offord (level – m)	Ouse	12.0m (AOD)	03/11/00	14:45	Not calculated
Hamerton (level – m)	Alconbur y Brook	27.87m(AO D)	06/11/00	09:15	Not calculated
Fordham	Snail	2.18	07/11/00	07:30	7
Gt Chesterford	Cam	10.83	30/10/00	15:00	6
Byrons Pool (level – m)	Cam	8.75m(AOD)	07/11/00	07:30	Not calculated
Rectory	Sapiston	9.99	08/11/00	02:15	8
Melford	Thet	9.86	10/11/00	01:15	3.75

Peak flows (with return periods where calculated) for selected sites in the Bedford and Ely Ouse Catchments.

Hydrographs have been plotted for each of the flow/level sites listed in the above table for the period 27/10/00 to 30/11/00.

* These flows have been modified to account for weir drowning.

Central Area Peak Rainfall data for the period 27 October 2000 to 30 November 2000.**Measured Rainfall with Associated Return Period**

Raingauge	River Catchment	Peak 18 Hour Rainfall Total & Date	Return Period*
Brackley	Upper Ouse	33.4 (29/10/00)	2.12
Drayton Parslow	Ousel	46.0 (29/10/00)	7.1
Yelden	Kym/Risely Brook	19.4 (29/10/00)	<1
Great Gidding	Alconbury Brook	30.2 (05/11/00)	1.41
Elmdon	Cam	33.6 (29/10/00)	2.4
Attleborough	Thet	23.8 (29/10/00)	1.2
Rushbrook	Lark	36.8 (29/10/00)	3.6
Fleam Dyke	Granta/Lodes	23.2 (05/11/00)	1.15

* Return Periods derived from the Flood Estimation Handbook (using annual maximum series)

EASTERN AREA**Eastern Area Return Periods****Peak Flows (relating to areas that have flooded)**

Gauging Station	River System	Peak Flow (Cumecs)	Date (First rainfall pulse)	Date (Second rainfall pulse)	Return Period (Years)
Essex Catchment					
Springfield	Chelmer	38.2	30/10/00		1 in 200
Beaches Mill	Chelmer	37	30/10/00		1 in 40
Stisted	Blackwater	19.9		07/11/00	1 in 8
Appleford Bridge	Blackwater	18.3		07/11/00	1 in 6
Earls Colne	Colne	16.9	30/10/00		1 in 5
Poolstreet	Colne	17	30/10/00		1 in 4
Westmill	Stour (u/s)	25.6		06/11/00	1 in 5
Langham	Stour (d/s)	42.8		08/11/00	1 in 12
Suffolk & Norfolk Catchment					
Farnham	Alde	11.5	30/10/00		1 in 6
Stowmarket	Gipping	28.5	30/10/00		1 in 16
Needham Mill	Waveney	33		07/11/00	1 in 3

Eastern Area**Rainfall (relating to areas that have flooded)**

Site	River System Catchment	Rainfall Duration (Hrs)	Rainfall Amount (mm)	Date	Return Period
Essex Catchment					
Springfield	Chelmer				No significant rainfall
Coggeshall	Blackwater	17	42.4	29/10/00	1 in 7
Poolstreet	Colne	15	27.6	29/10/00	1 in 2
Earls Colne	Colne	13	30.4	29/10/00	1 in 3
Kirtling Green	Stour (u/s)	17	21	29/10/00	1 in 1
Langham	Stour (d/s)	17	39	29/10/00	1 in 5
Suffolk & Norfolk Catchment					
Benhall	Fromus	15	35	29/10/00	1 in 4
Needham Market	Gipping	16	30.8	29/10/00	1 in 2
Worlingham	Waveney	15	21.2	29/10/00	Annual

5.3 EFFECT ON PROPERTIES

5.3.1 Introduction

Anglian Region has some 5,800 Km of main river with 1,200kms embanked. Additionally the region has 1,300 Km of tidal defences to protect low lying land, particularly along the east coast. One fifth of the region is below high tide level and at risk of flooding from a combination of fluvial and tidal rivers. The lower reaches of many rivers meander across low-lying land with only gentle slopes to their estuaries. Although East Anglian rivers can be slow to react, compared to upland rivers elsewhere, the inundation of floodplains can be long lasting and widespread. Flood defences in the form of Flood Storage Reservoirs (FSR) are in place on major rivers, e.g. the Nene and the Great Ouse to alleviate flooding and provide flood water storage when unable to discharge to the sea due to high tide levels. Some 300,000 properties are in river and coastal floodplains.

Rainfall often affects entire Areas or indeed the whole Region at the same time. This can result in much of the available workforce and staff being involved in reacting to the flood emergency response. Flooded properties are often distributed widely across the Region in isolated small clusters and are difficult to identify without deploying large numbers of staff to flood prone areas.

5.3.2 Defences

During this event high water levels were recorded in many watercourses but generally embankments and other defences were not tested to their maximum capacity.

5.3.3 Repeat Flooding

Few locations were affected by repeat flooding during this event. Details of locations where this did occur are included in table 5.3.1.

5.3.4 Locations affected by Flooding

The following table indicate locations where flooding of property occurred and the source of the flooding.

Table 5.3.1 Summary of Locations Affected by Flooding

Location	Properties	Source of Flooding	Designation
Geddington	3	River Nene	Main River
Great Easton	4	River Welland and Surface Water	Main River and Surface Water
Stamford	2	River Welland	Main River
Market Deeping	1	River Welland	Main River
Brigstock	1	River Nene	Main River
Harpers Brook	3	River Nene and Harpers Brook	Main River and Non Main River
Everdon	1	Ordinary watercourse	Non Main River
North Witham	2	River Witham	Main River
Great Staughton	2	Great Ouse	Main River
Wybston	3	Ordinary watercourse	Non Main River
Upper Caldecote	1	Unsure	Non Main River
Location	Properties	Source of Flooding	Designation

Leighton Buzzard	3	Surface water	Surface Water
Great Barford	3	Ordinary watercourse	Non Main River
Haynes	1	Ordinary watercourse	Non Main River
Bedford	3	Great Ouse	Main River
Clophill	1	River Flit	Main River
Hatch	1	Ordinary watercourse	Non Main River
Westonning	1	Ordinary watercourse	Non Main River
Turvey	1	Great Ouse	Main River
Littleport	2	Surface water	Surface Water
Great Baddow	6	River Chelmer	Main River
Maldon	3	River Chelmer	Main River
Bradwell	4	River Blackwater	Main River
Coggenshall	3	River Blackwater	Main River
Feering	2	River Blackwater	Main River
Witham	2	River Blackwater	Main River
Halstead	7	River Colne	Main River
Maplestead	1	River Colne	Main River
Great Yeldham	1	River Colne	Main River
Earl's White/Colne	10	River Colne (Repeat flooding)	Main River
Chappel	5	River Colne	Main River
Monks Eleigh	1	River Brett	Main River
Higham	1	River Brett	Main River
Boxted	1	River Stour	Main River
Harleston	1	River Waveney (repeat flooding)	Main River
Needham	1	River Waveney (repeat flooding)	Main River
Geldeston	1	River Waveney	Main River
Badingham	1	River Alde	Main River
Stowmarket (Great Finborough)	3	River Gipping (Repeat flooding)	Main River
Needham Market	3	River Gipping	Main River

5.4 ADEQUACY OF DEFENCES

Defences were not put under great pressure by the event of October/November 2000. No defences failed, however in some locations defences were over-topped.

5.5 ISSUES ARISING

- a) Wide-spread events appear to be occurring more often and these lead to short-notice requirements for large numbers of staff to monitor, forecast and issue flood warnings.
- b) Flooded properties are frequently widely spaced and in isolated locations. This creates difficulties in finding out how many properties have been flooded during any event, particularly if the source is non main river.
- c) Situation reporting requirements become onerous and difficult to manage.

5.6 RECOMMENDATIONS

- a) Regular training is needed to ensure that sufficient staff are competent and available to respond to incidents.
- b) Set up dialogue with DSG and other staff on the ground to report flooded properties to the AIR or Area Flood Warning Teams. Encourage information on flooded properties from partner organisations.
- c) Review data capture practices to ensure that statistics and other event information can be drawn from operational logs.

ANNEX A
HYDROGRAPHS

A1 R04

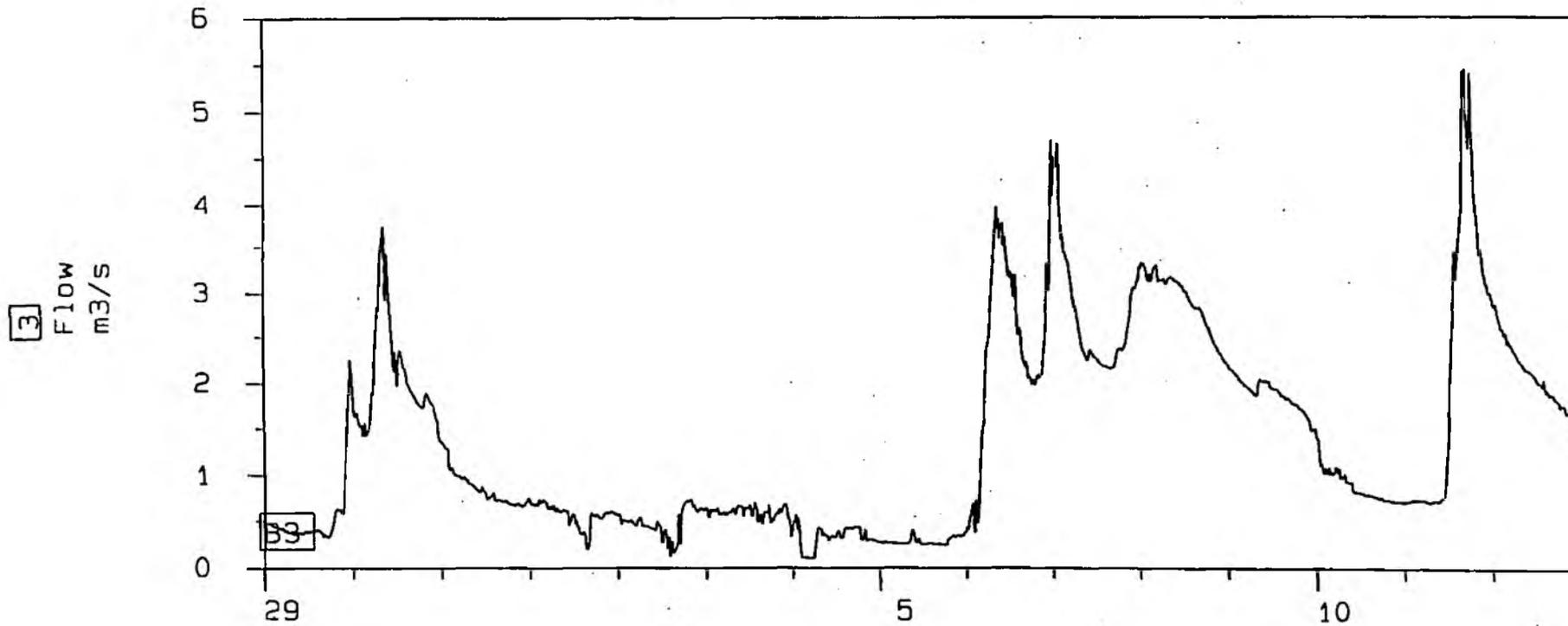
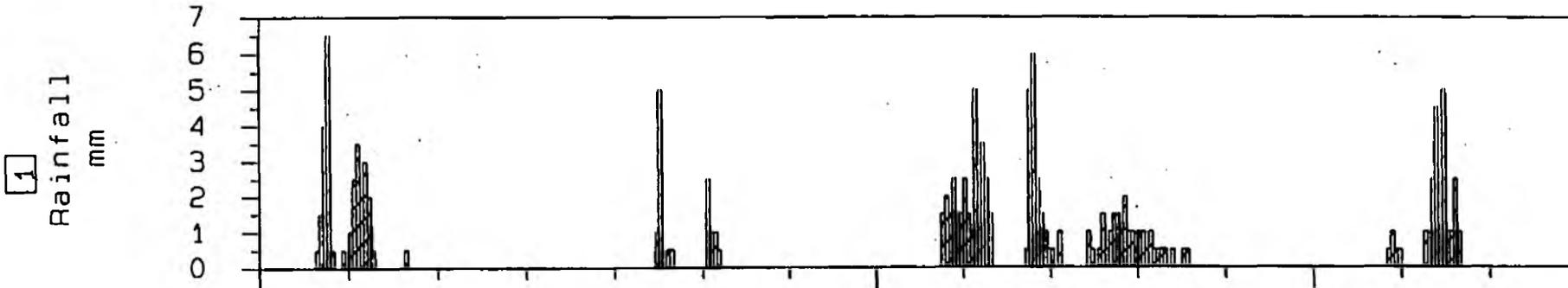
-- LUDFORD

(L)

B3

U29008

- Mkt.Rasen ultrasonic

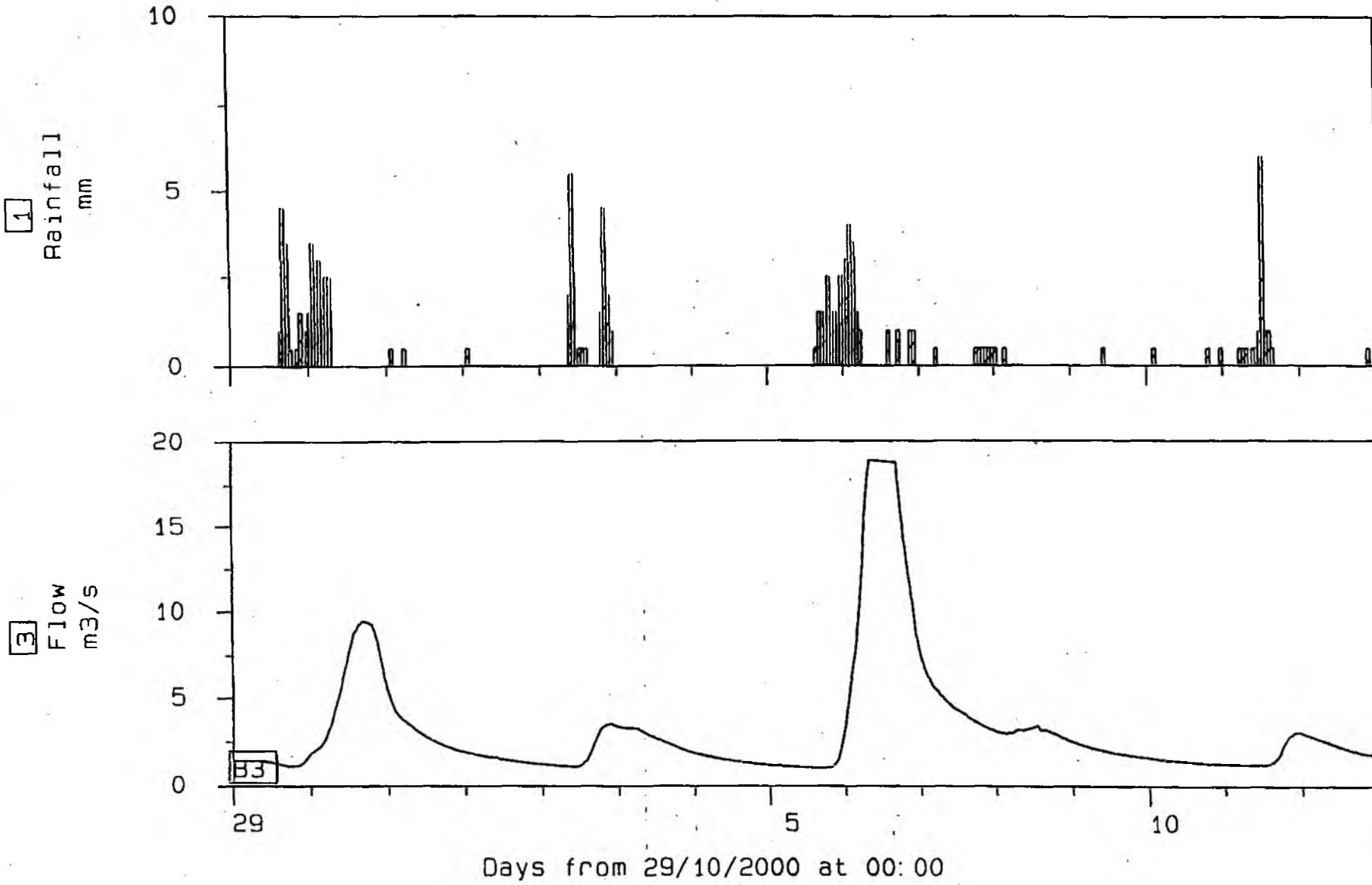


29 5 10

Days from 29/10/2000 at 00:00

A1 V08 - DINGLEY WT (L)

B3 031010 - Fosters Bridge



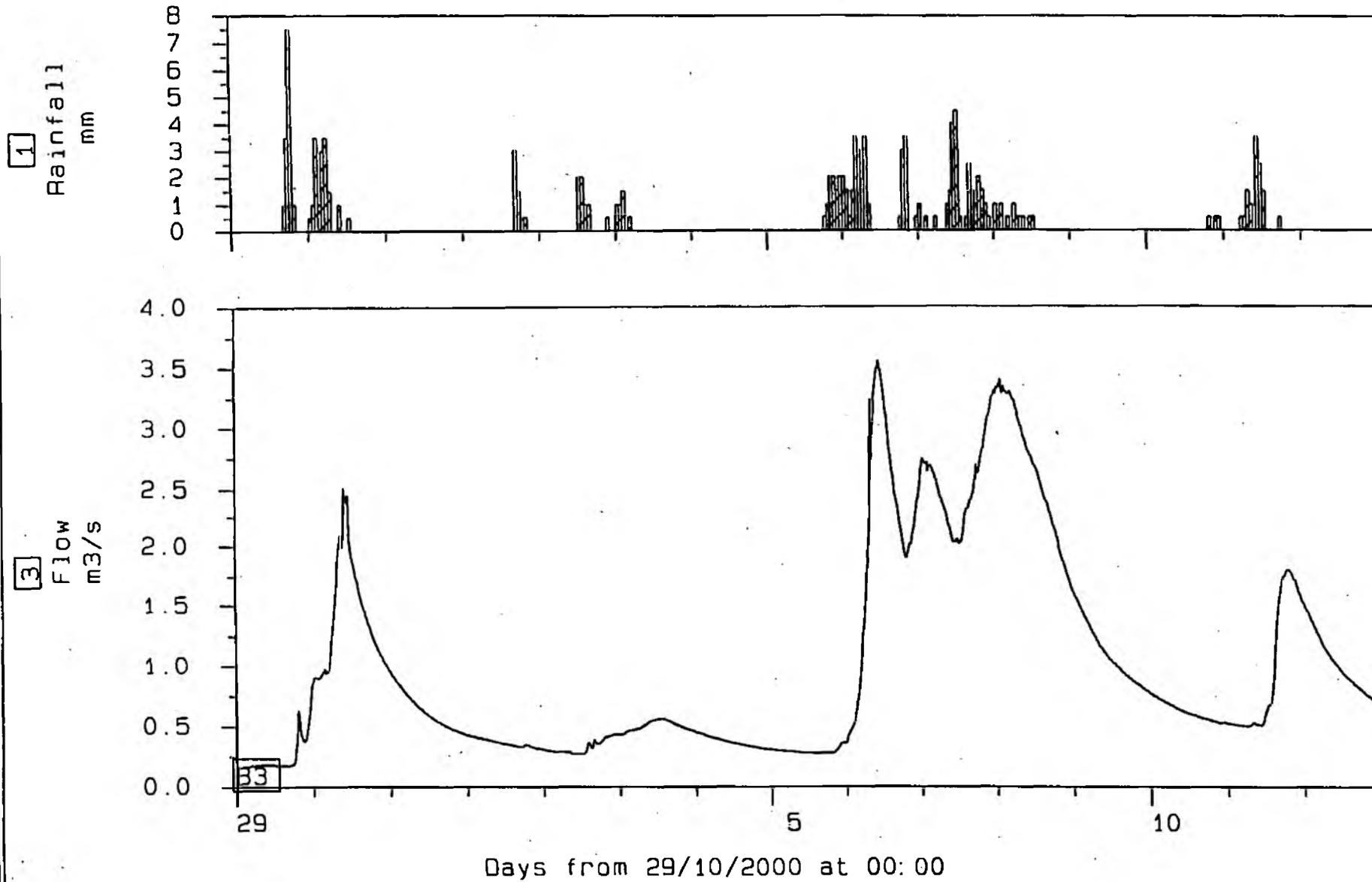
A1 R06

- KEELBY

(L)

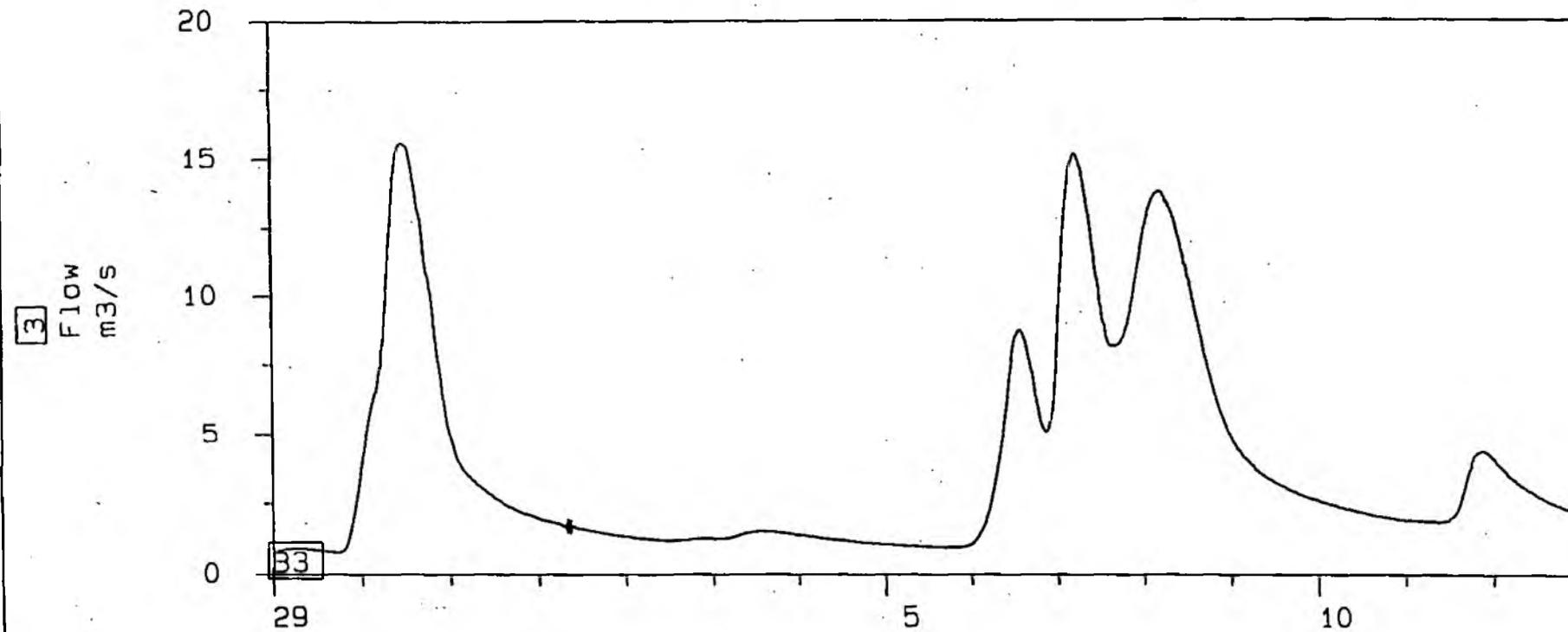
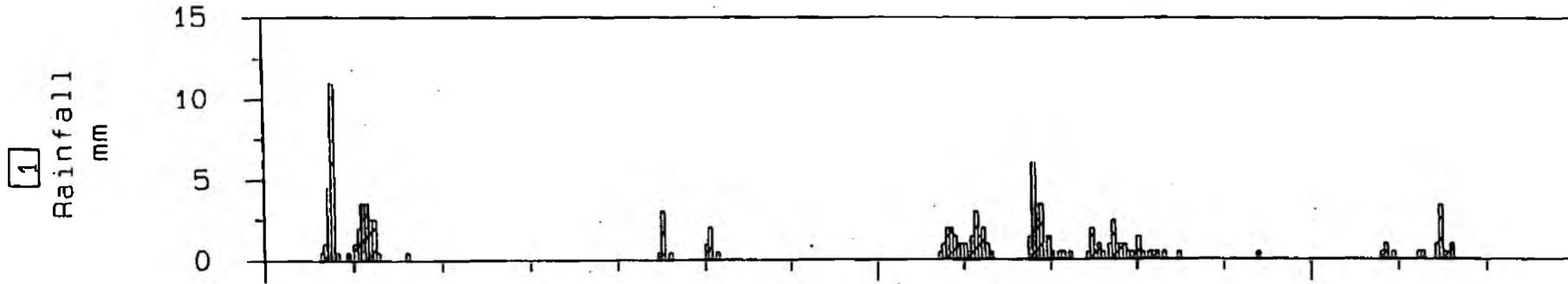
B3 029021

- Laceby Beck



A1 S01 - TOFT NEWTON (T)

B3 029204 - Bishopbridge - Ancholme

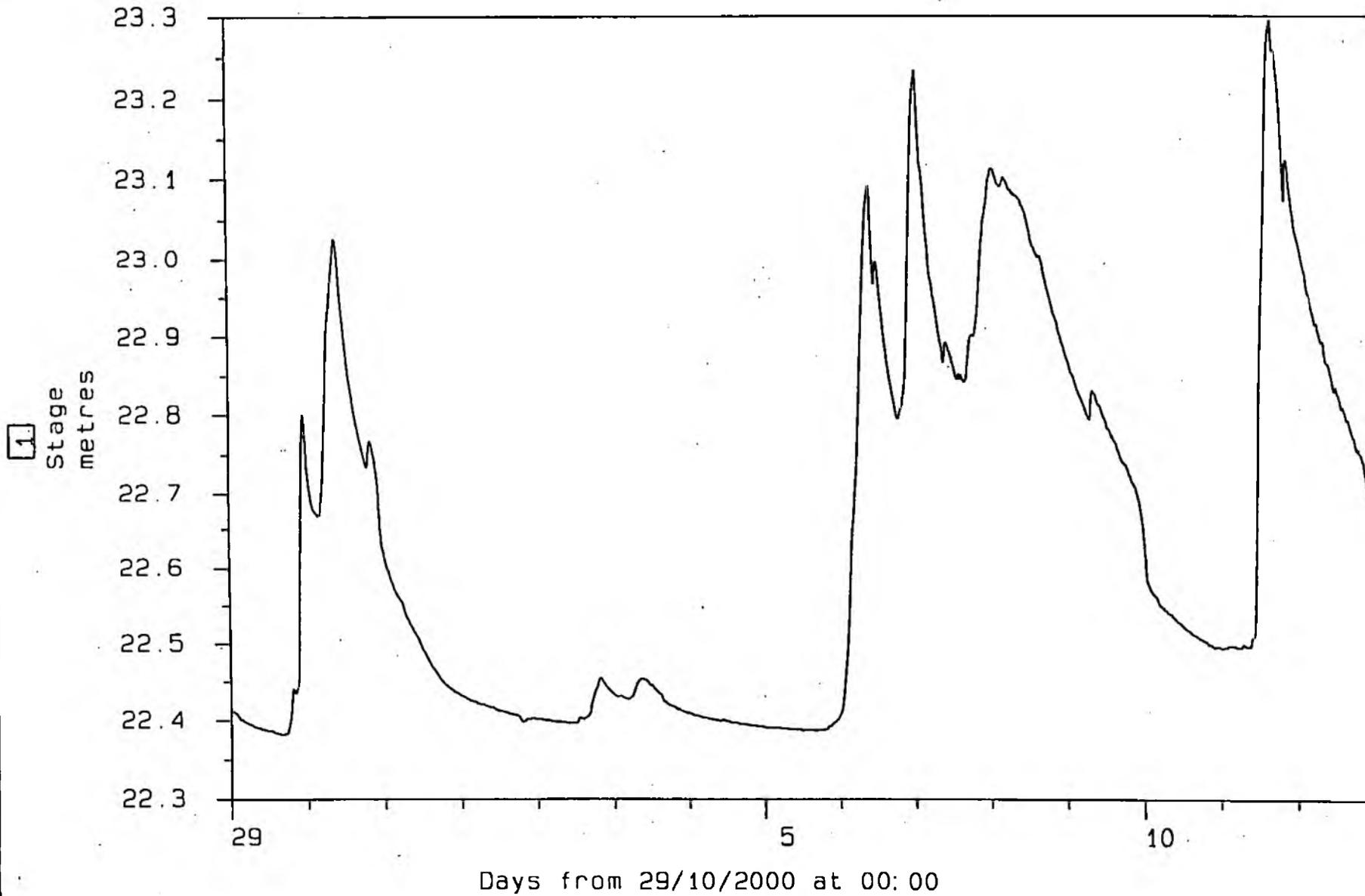


Days from 29/10/2000 at 00:00

Auth.: L29008

Name: Market Rasen

Locat.: Rase

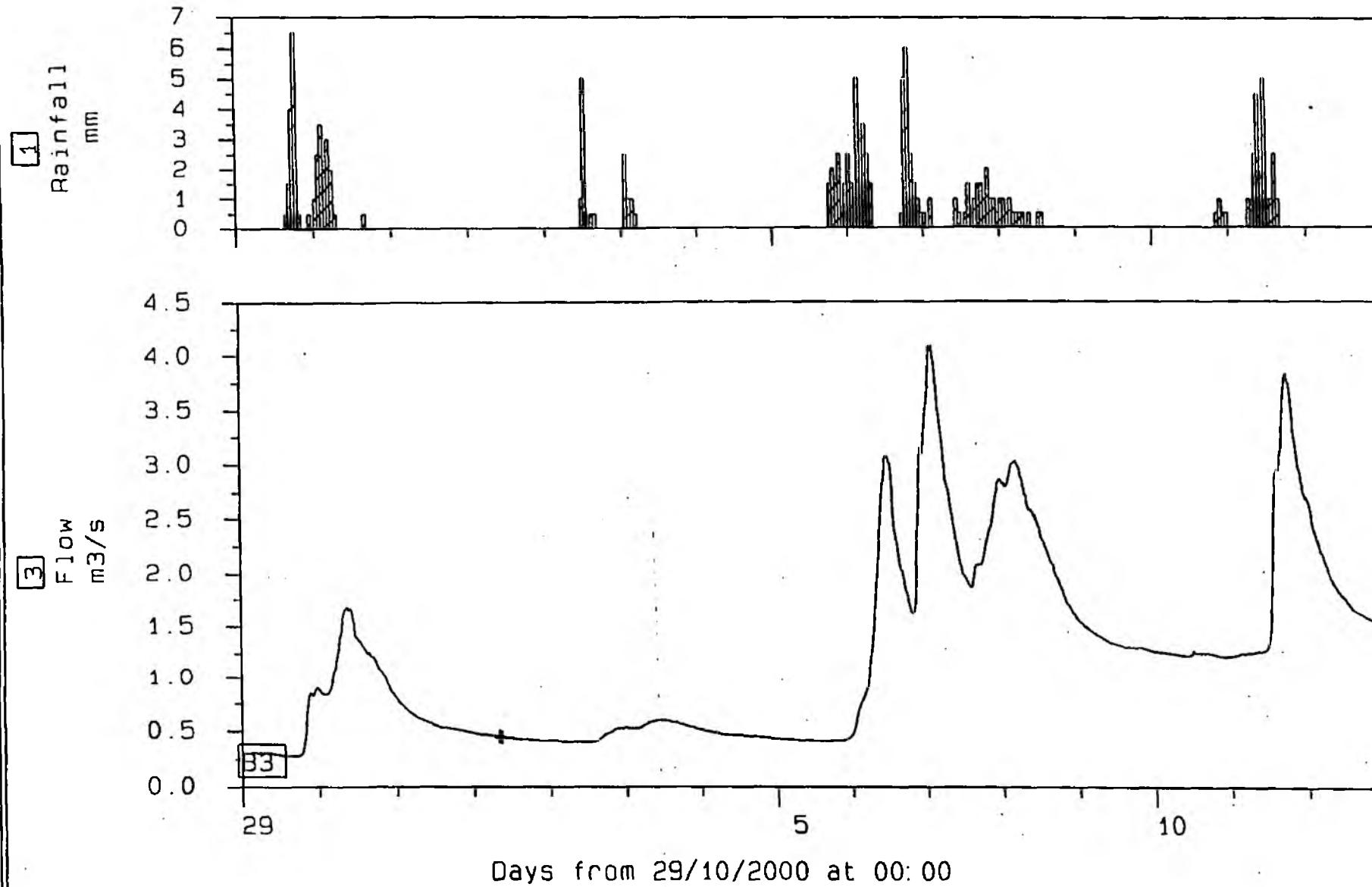


A1 R04

- LUDFORD (L)

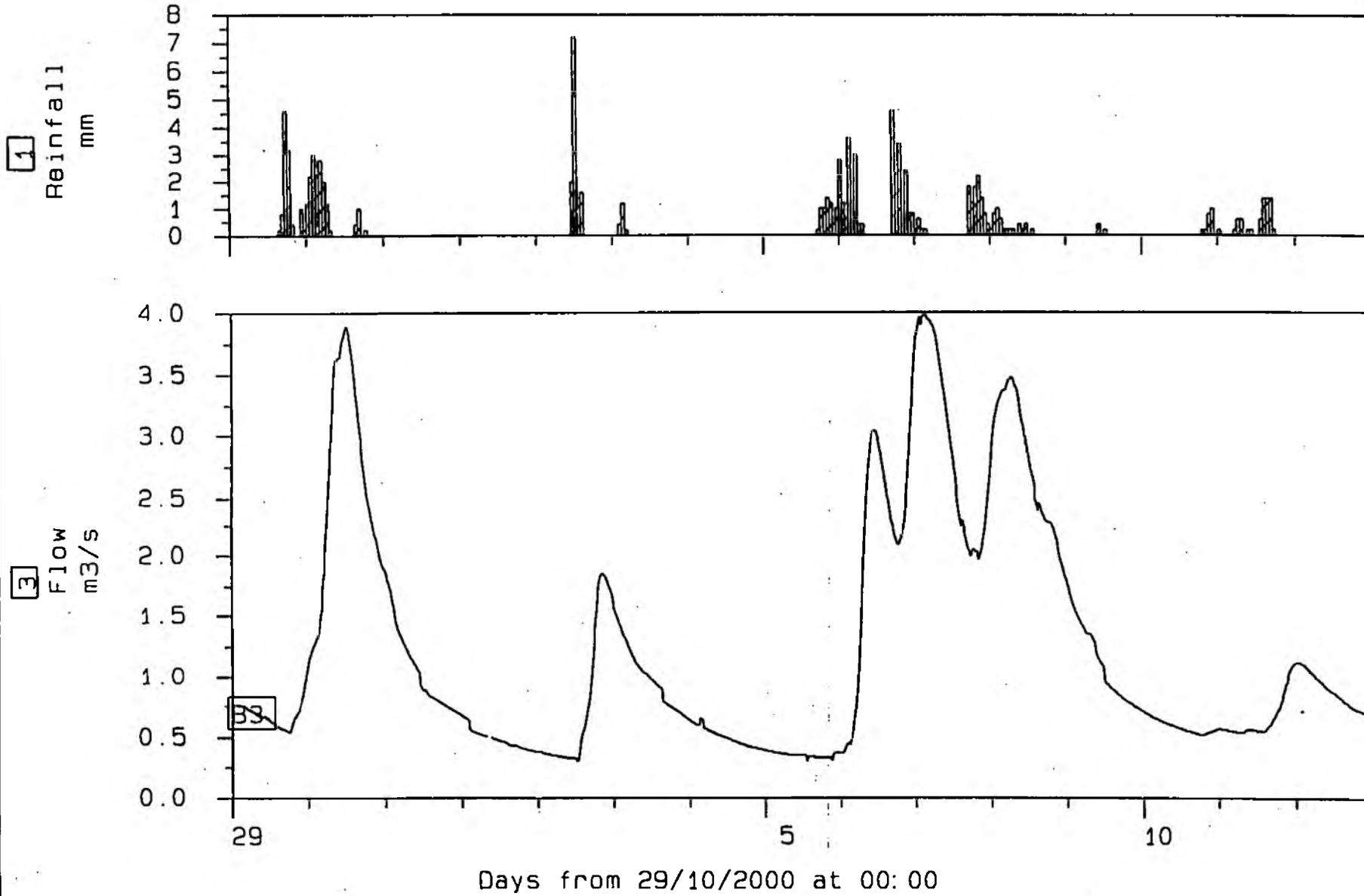
B3 029001

- Brigsley Waithe Beck



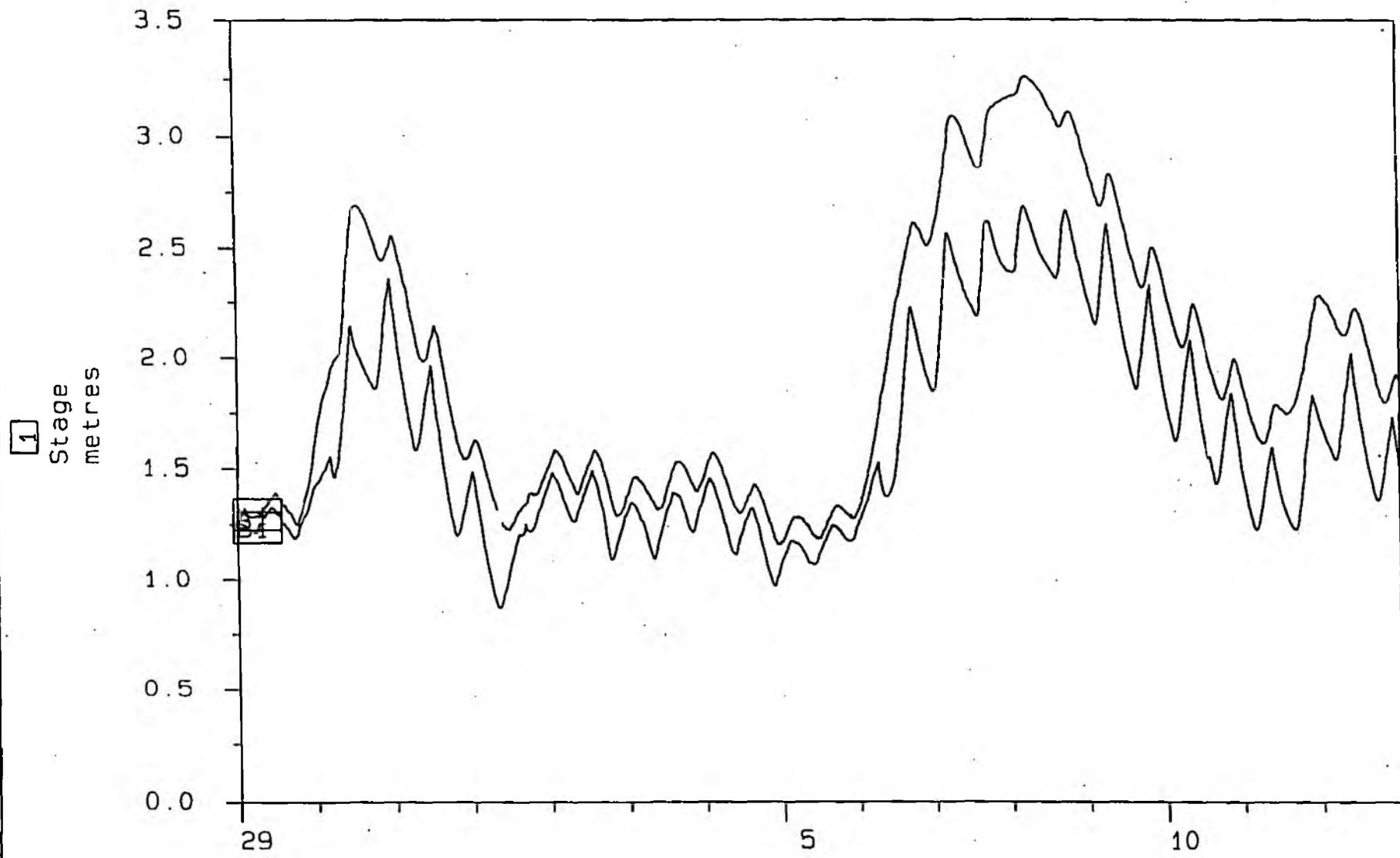
A1 S14 - ULCEBY CROSS (T)

B3 U29015 - Bilsby ultrasonics



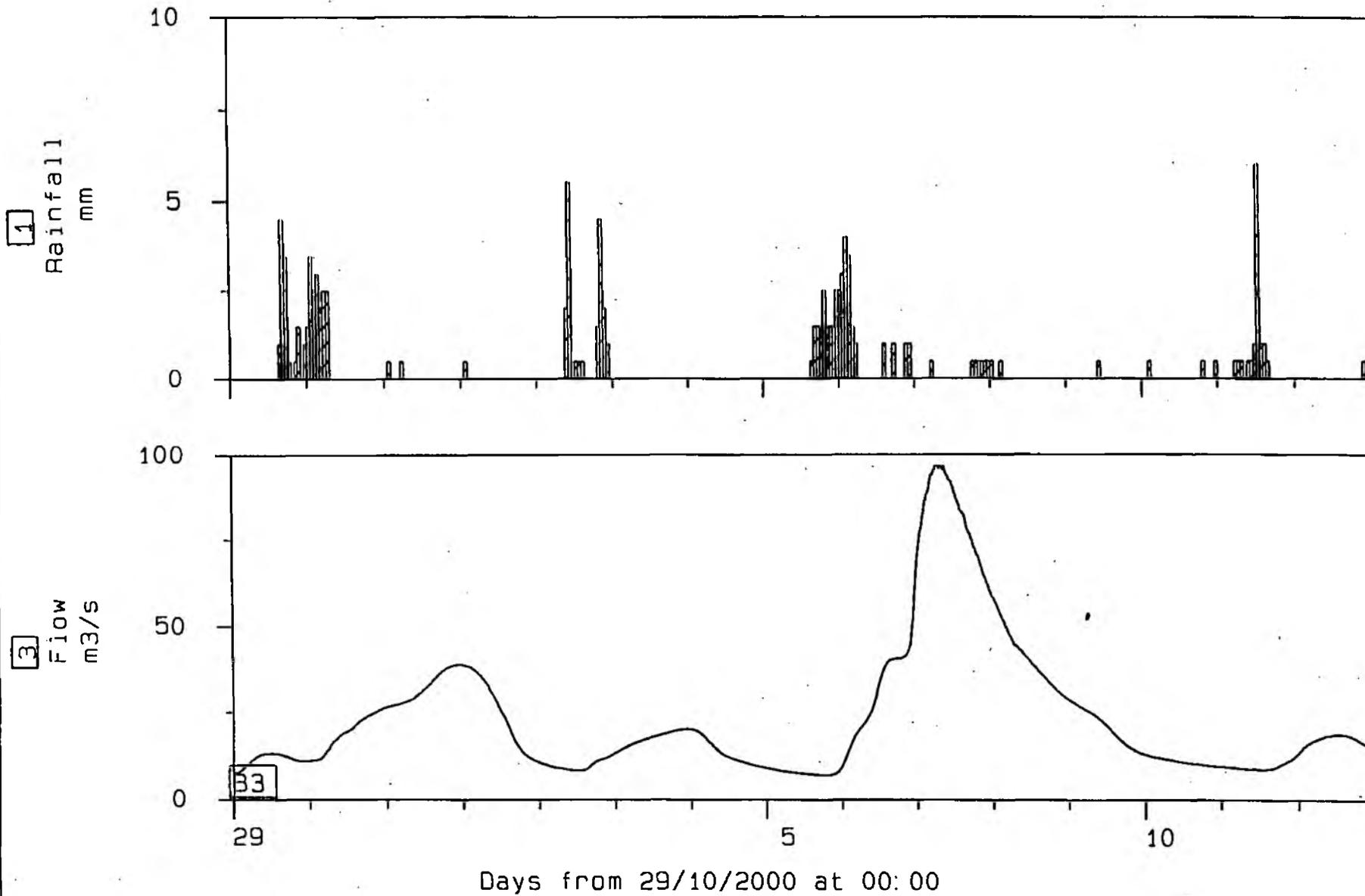
A1 L29002 - Brandy Wharfe

B1 L29003 - Brigg



A1 V08 - DINGLEY WT (L)

B3 031005 - Tixover

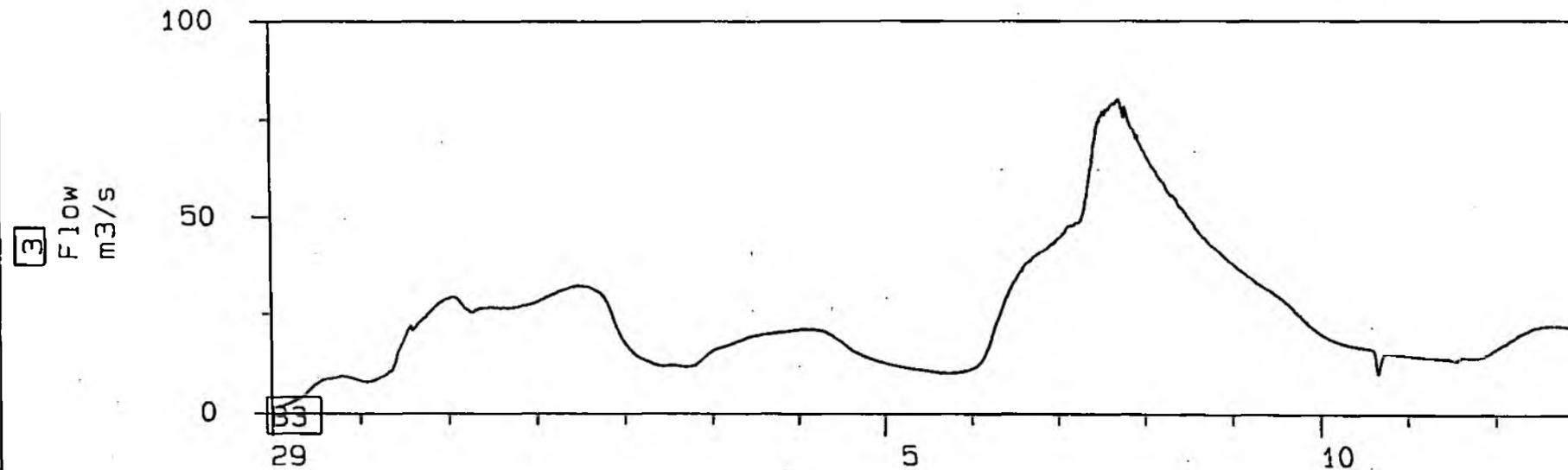
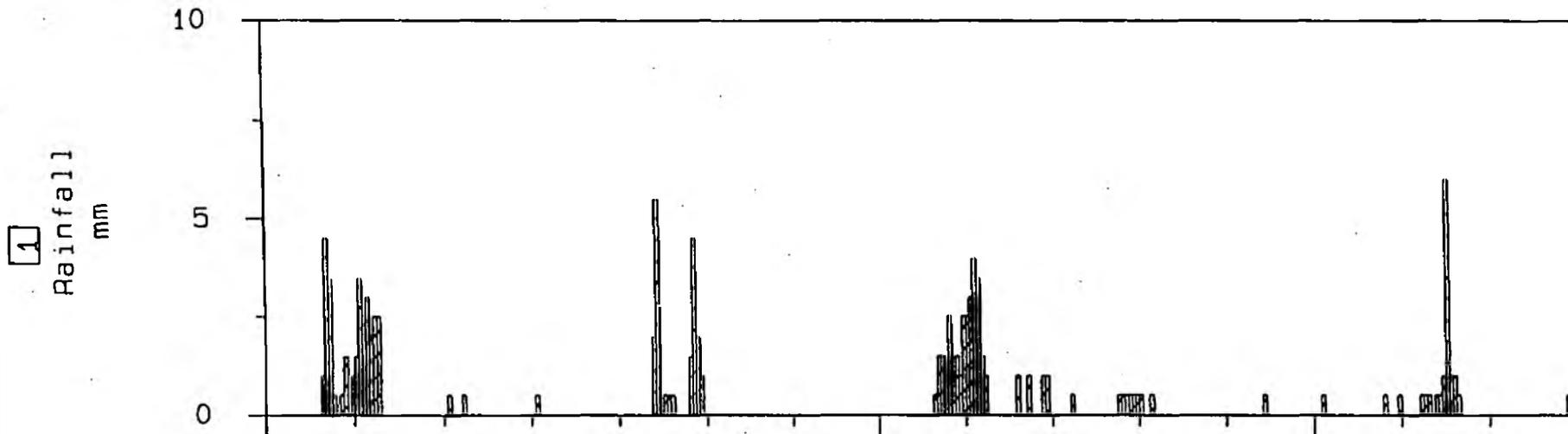


A1 V08

- DINGLEY WT (L)

B3 031004

- Tallington



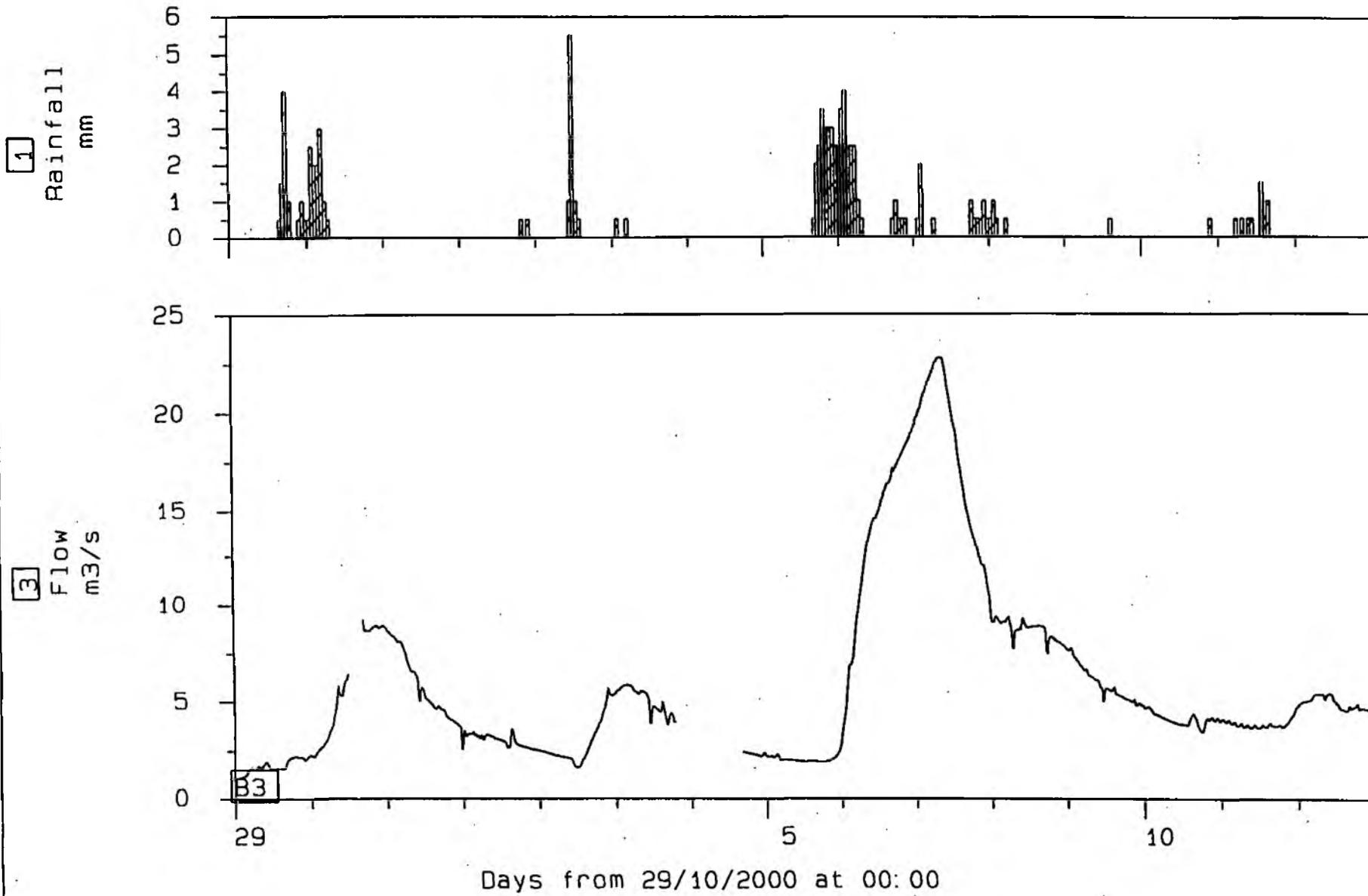
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A1 U17

- ROPSLEY S.T.W (L)

B3 U31002

- Kates Br ultrasonic

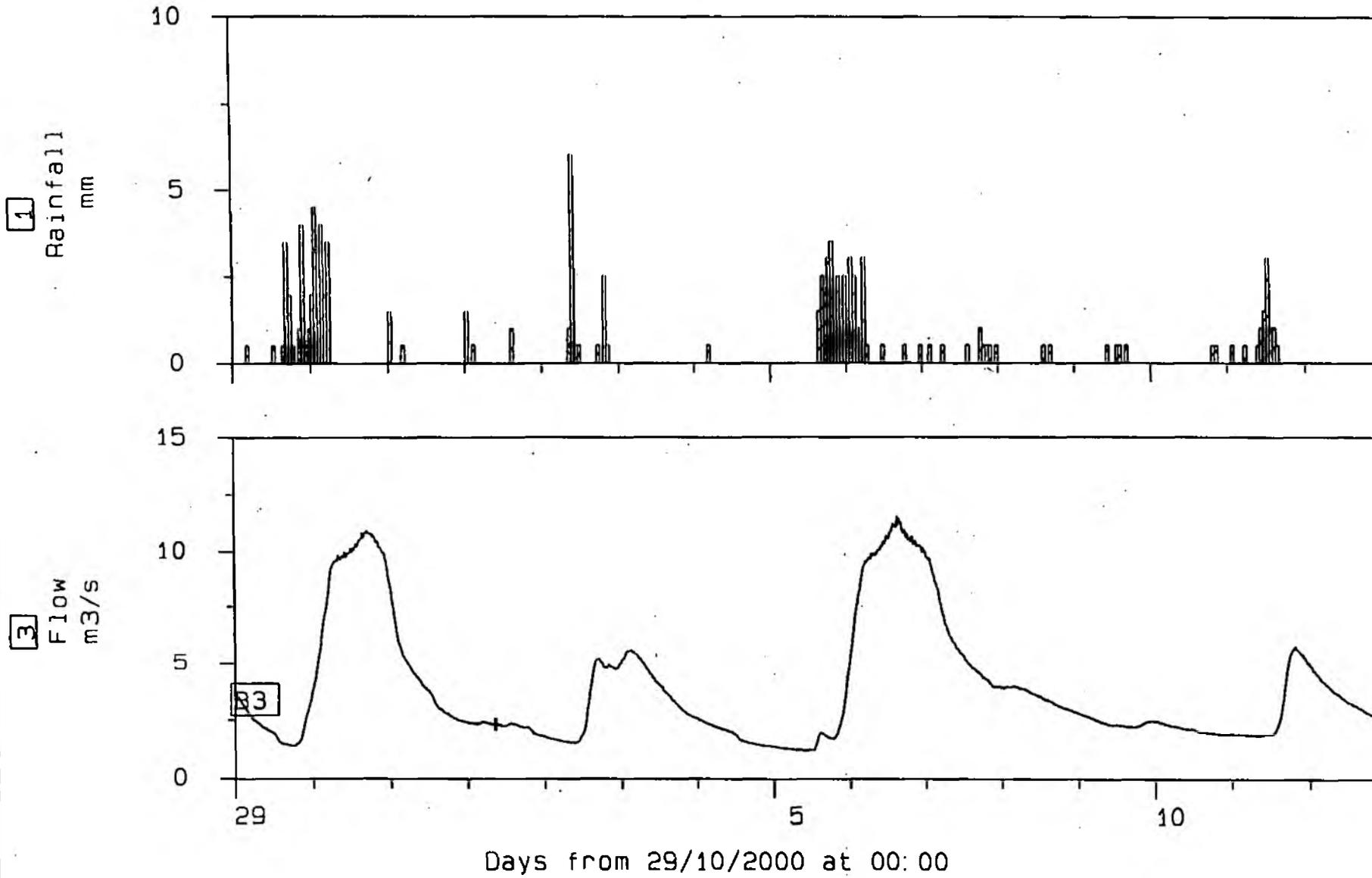


A1 V07

- DAVENTRY (L)

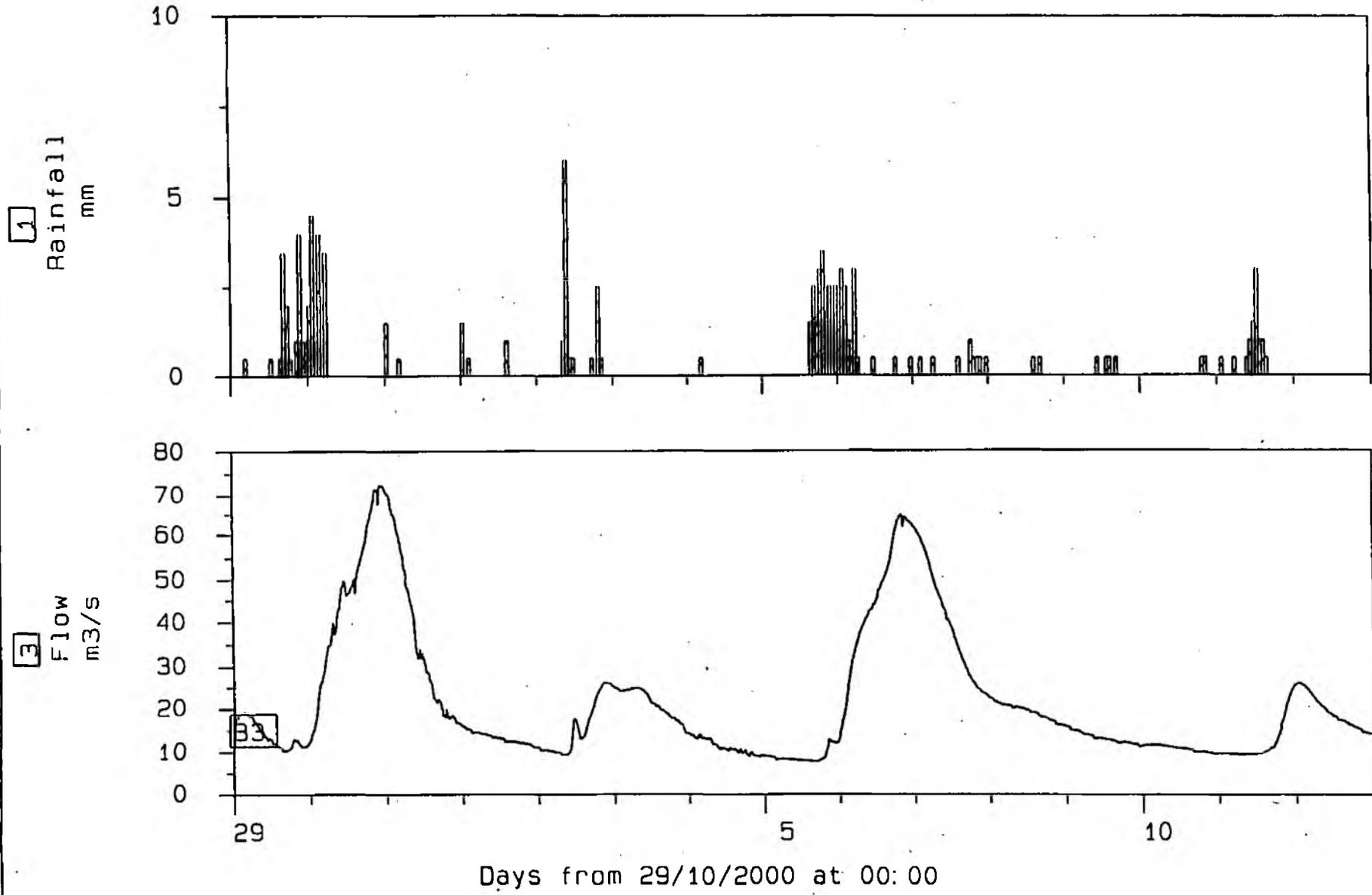
B3 032008

- Dodford



A1 V07 - DAVENTRY (L)

B3 U32001 - South Bridge ultra

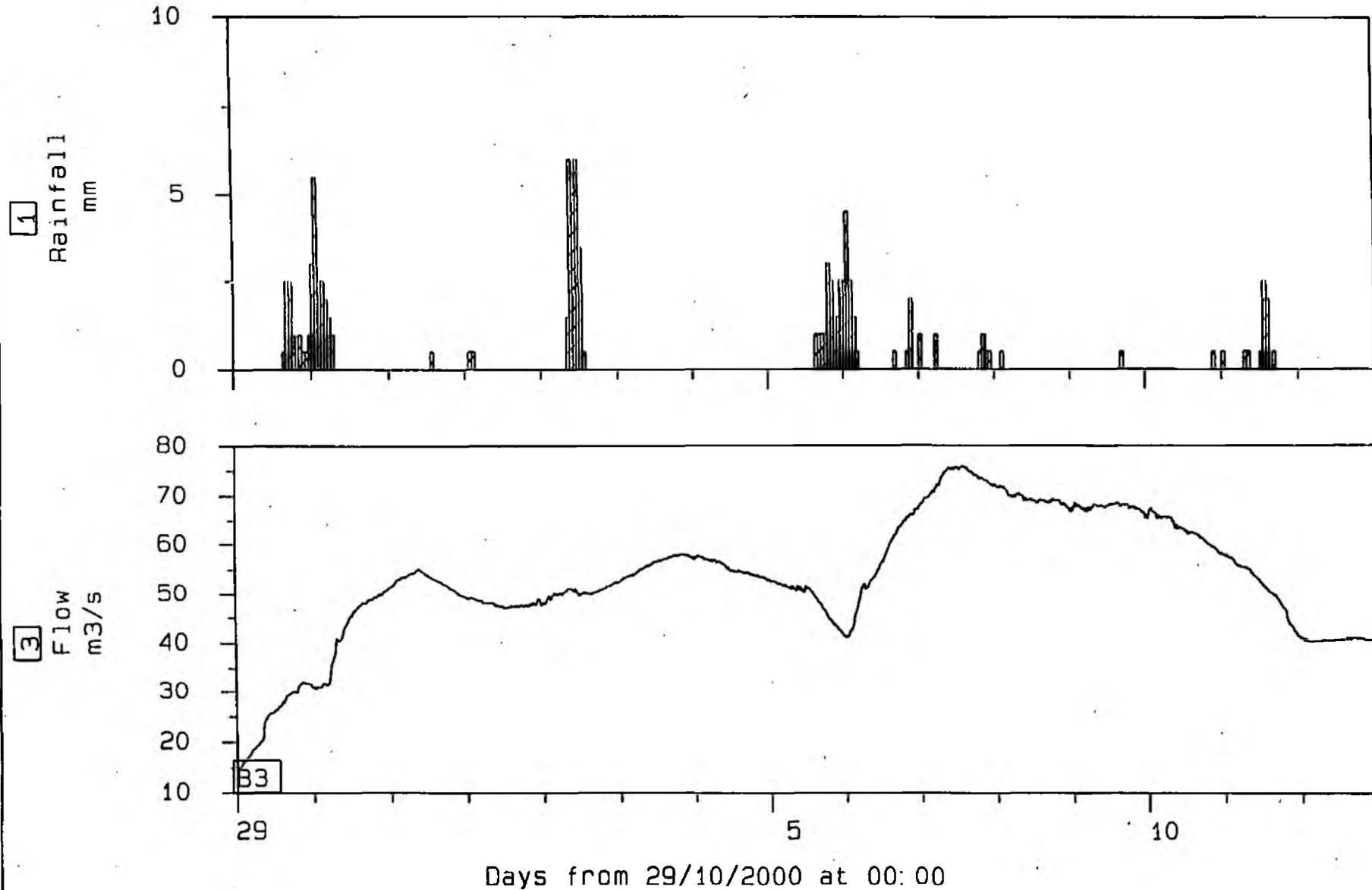


A1 V32

- WELLINGBOROUGH PS (L).

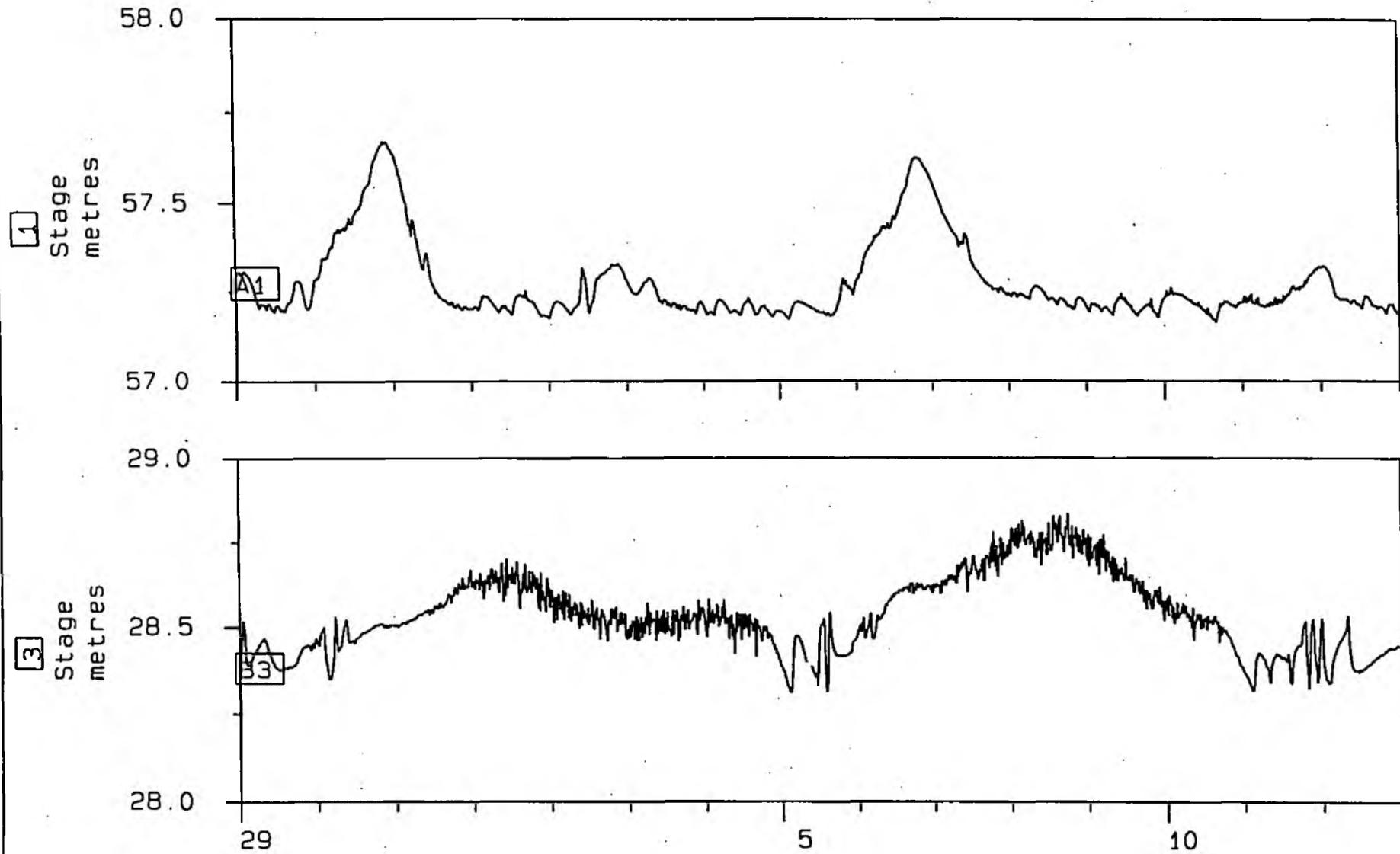
B3 U32210

- Wansford Ultra High



A1 L32066 - Southbridge, Nthmton

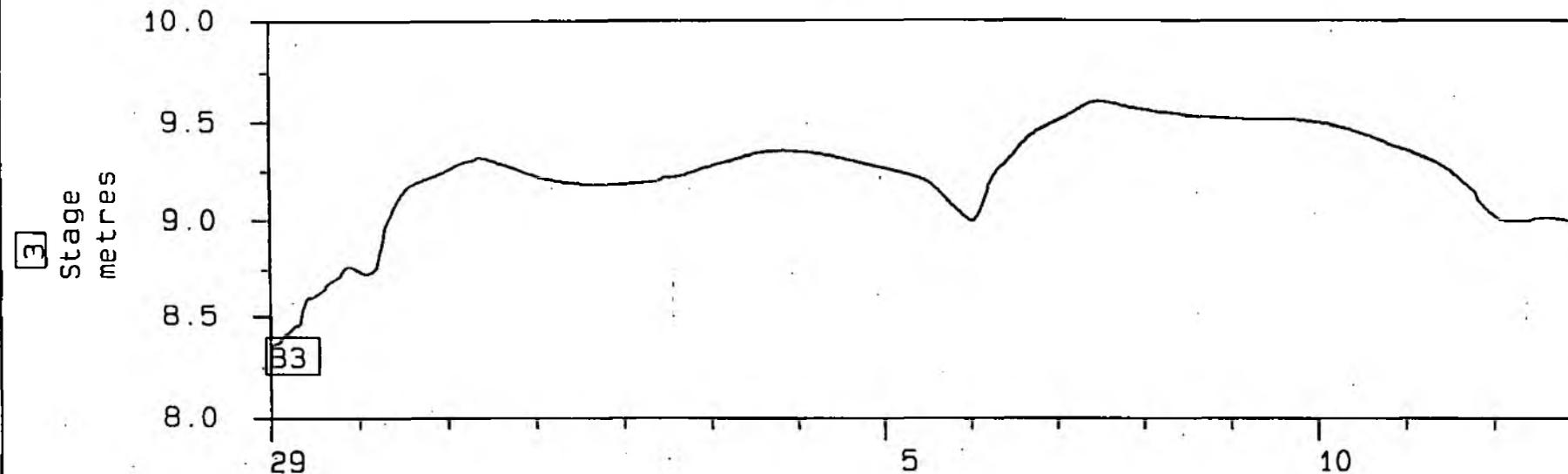
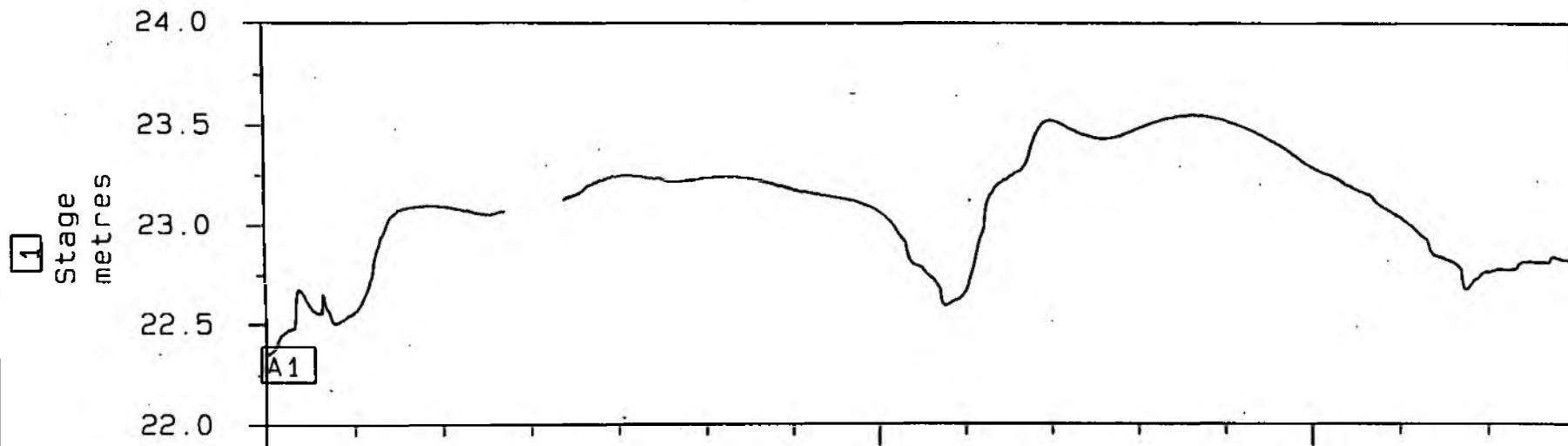
B3 L32042 - ISLIP LOCK SL.



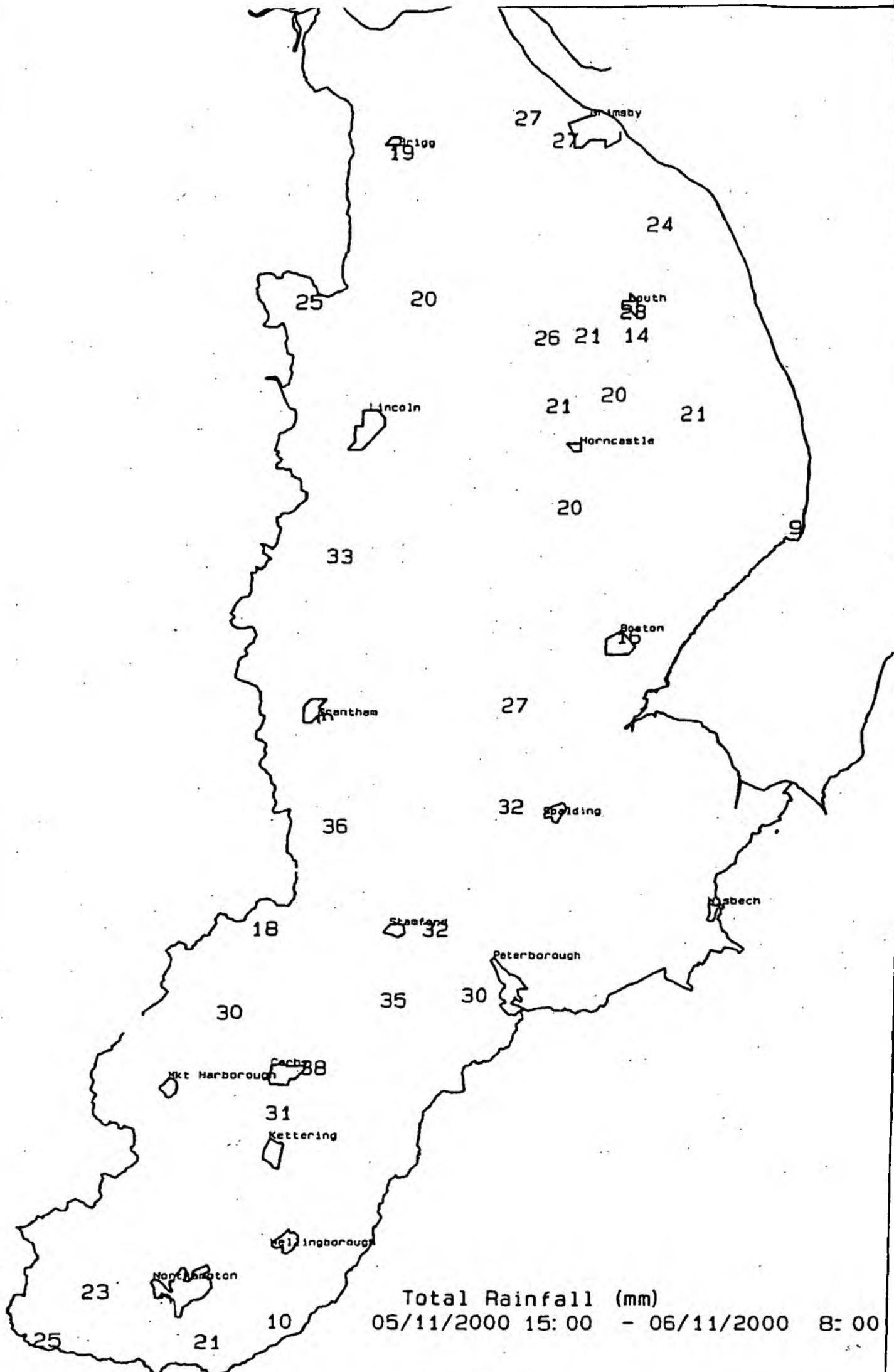
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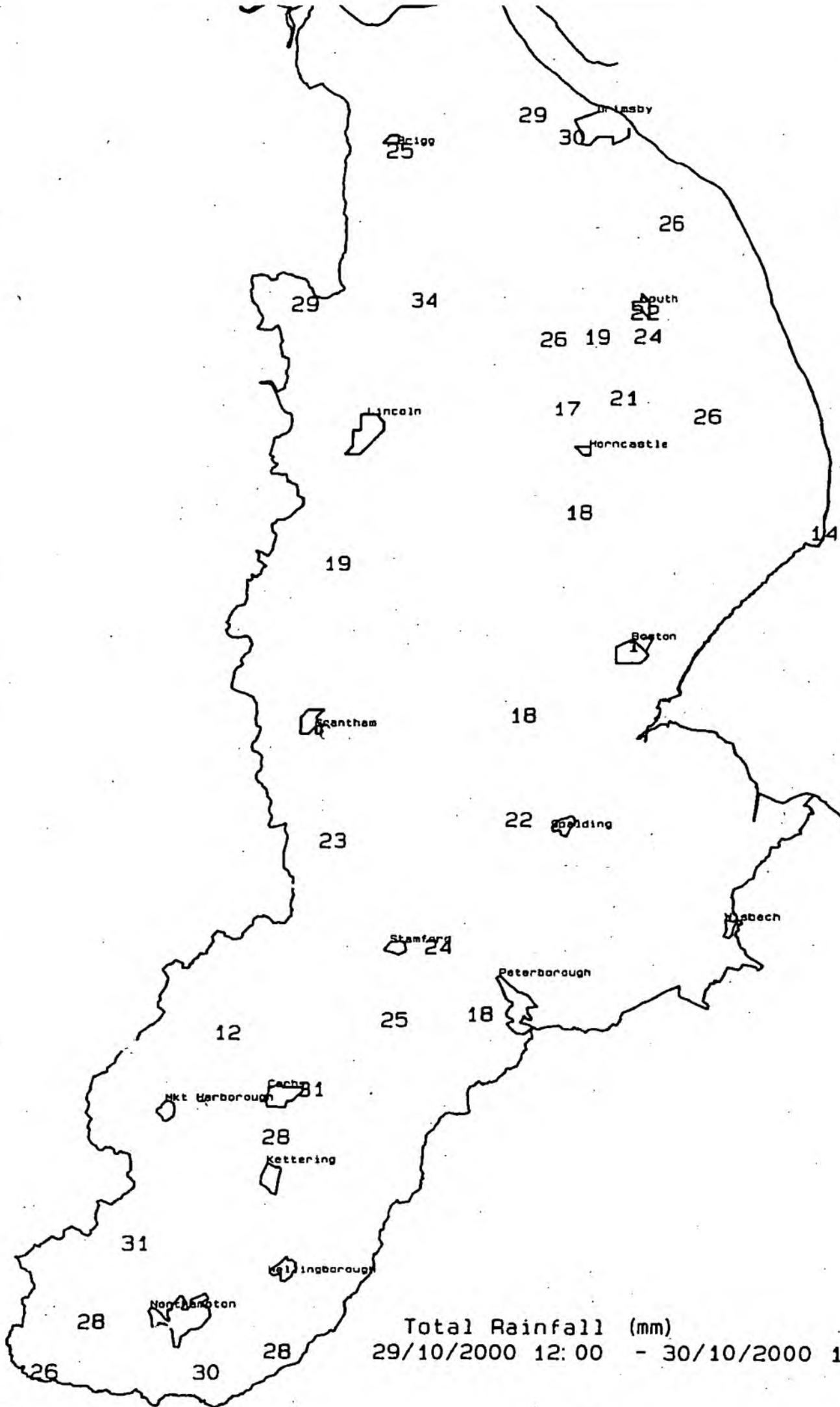
A1 L32004 - Lilford

B3 032010 - Wansford

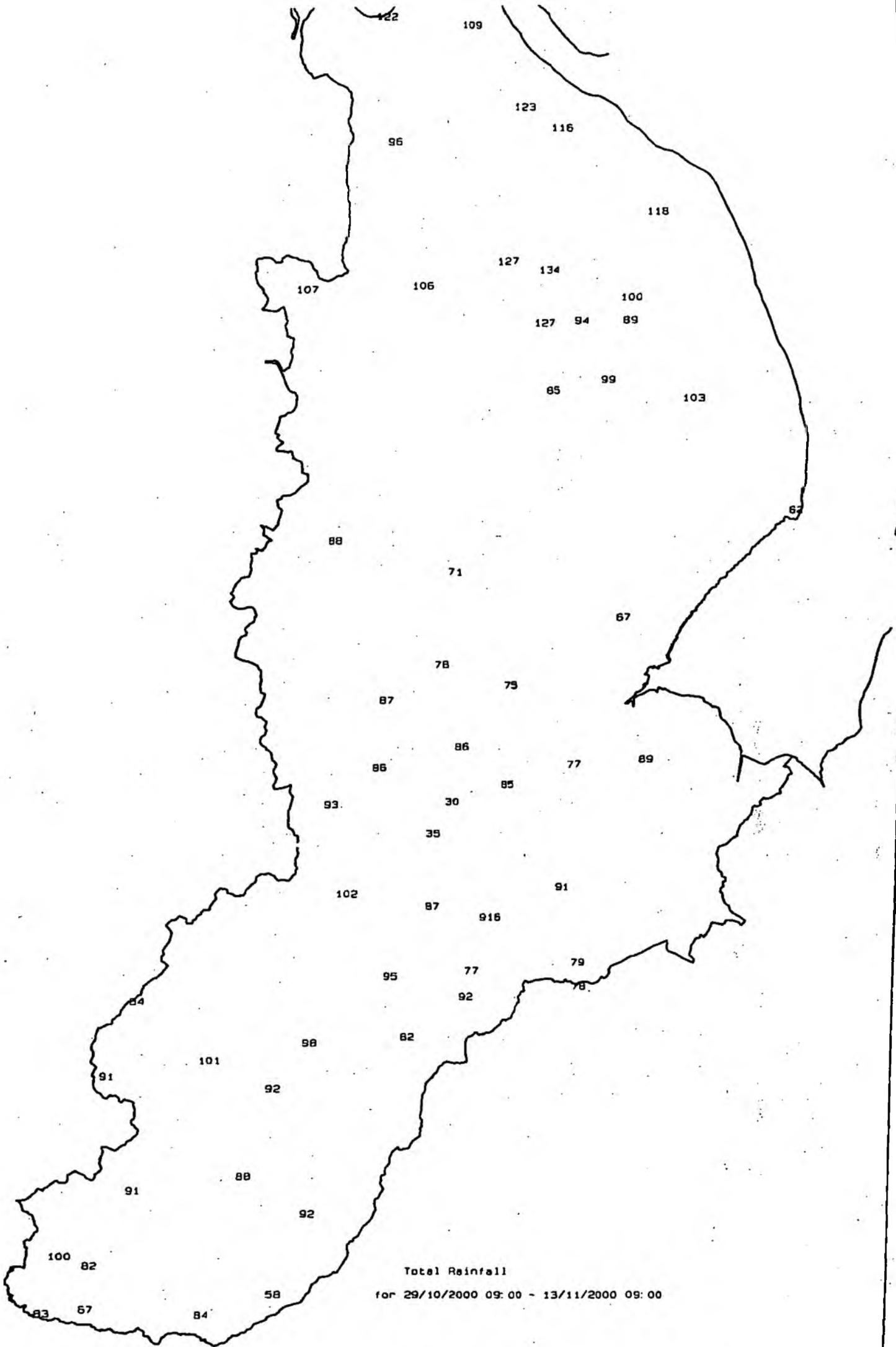


Days from 29/10/2000 at 00:00



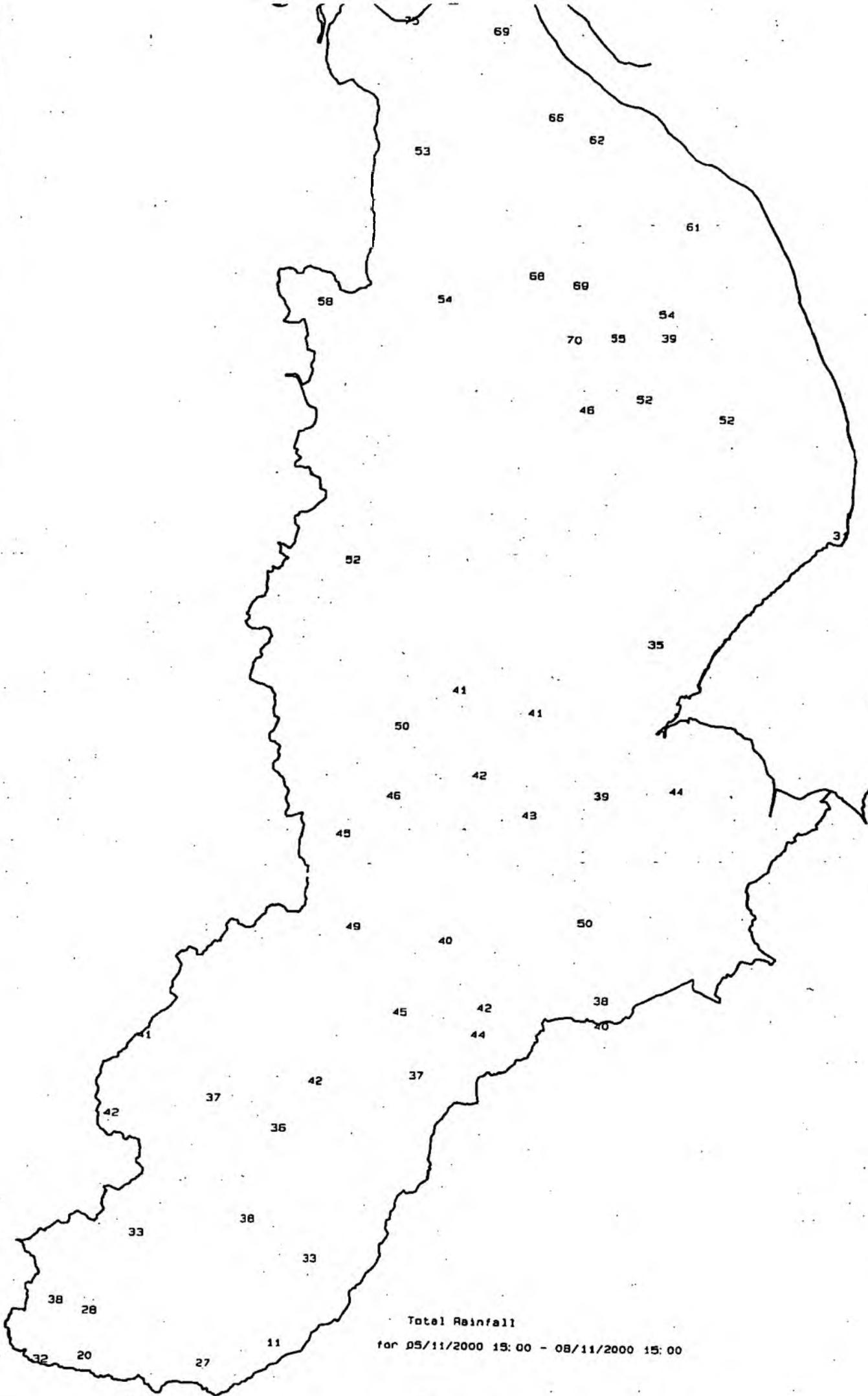


Total Rainfall (mm)
 29/10/2000 12:00 - 30/10/2000 14:00

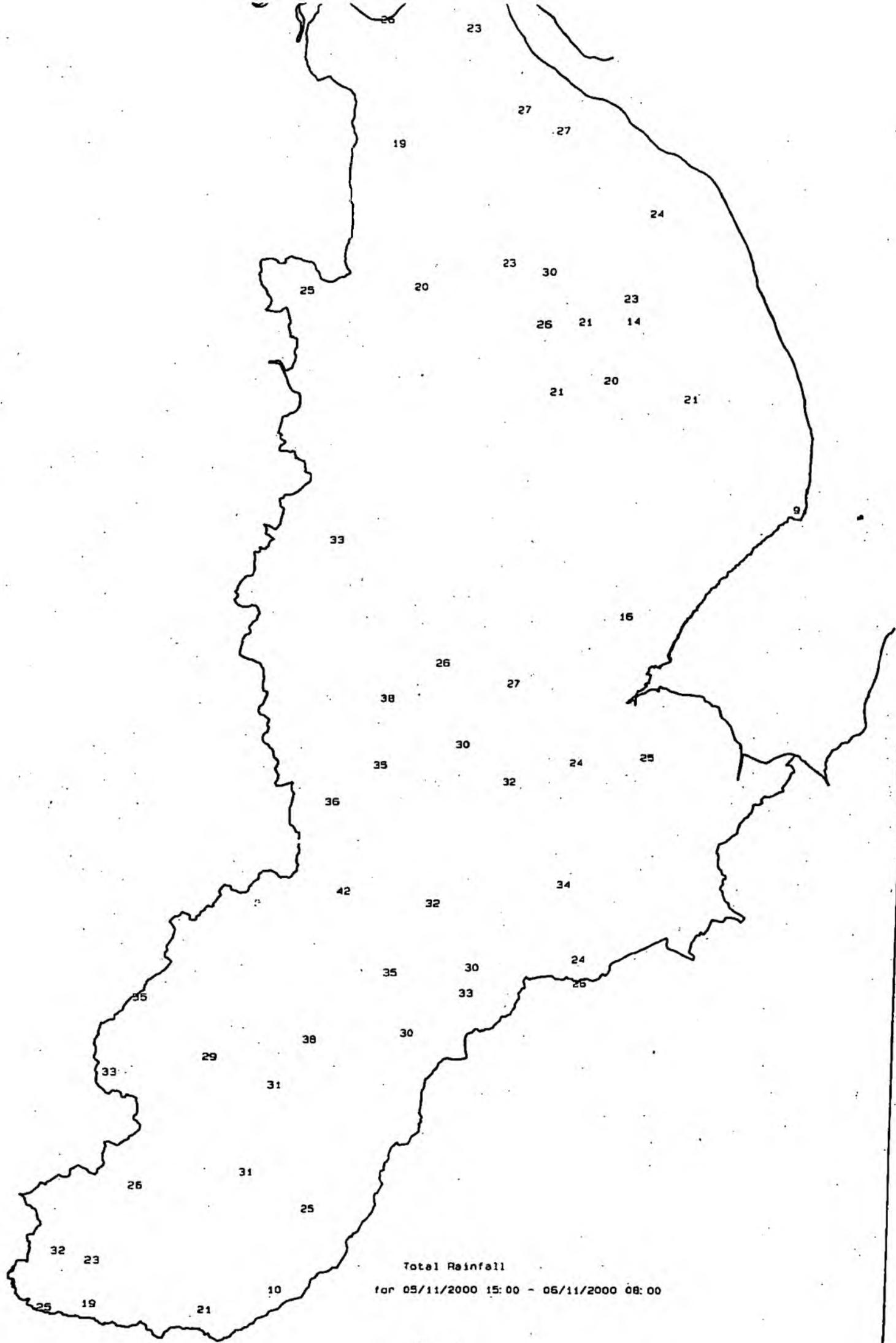


Total Rainfall
for 29/10/2000 09:00 - 13/11/2000 09:00

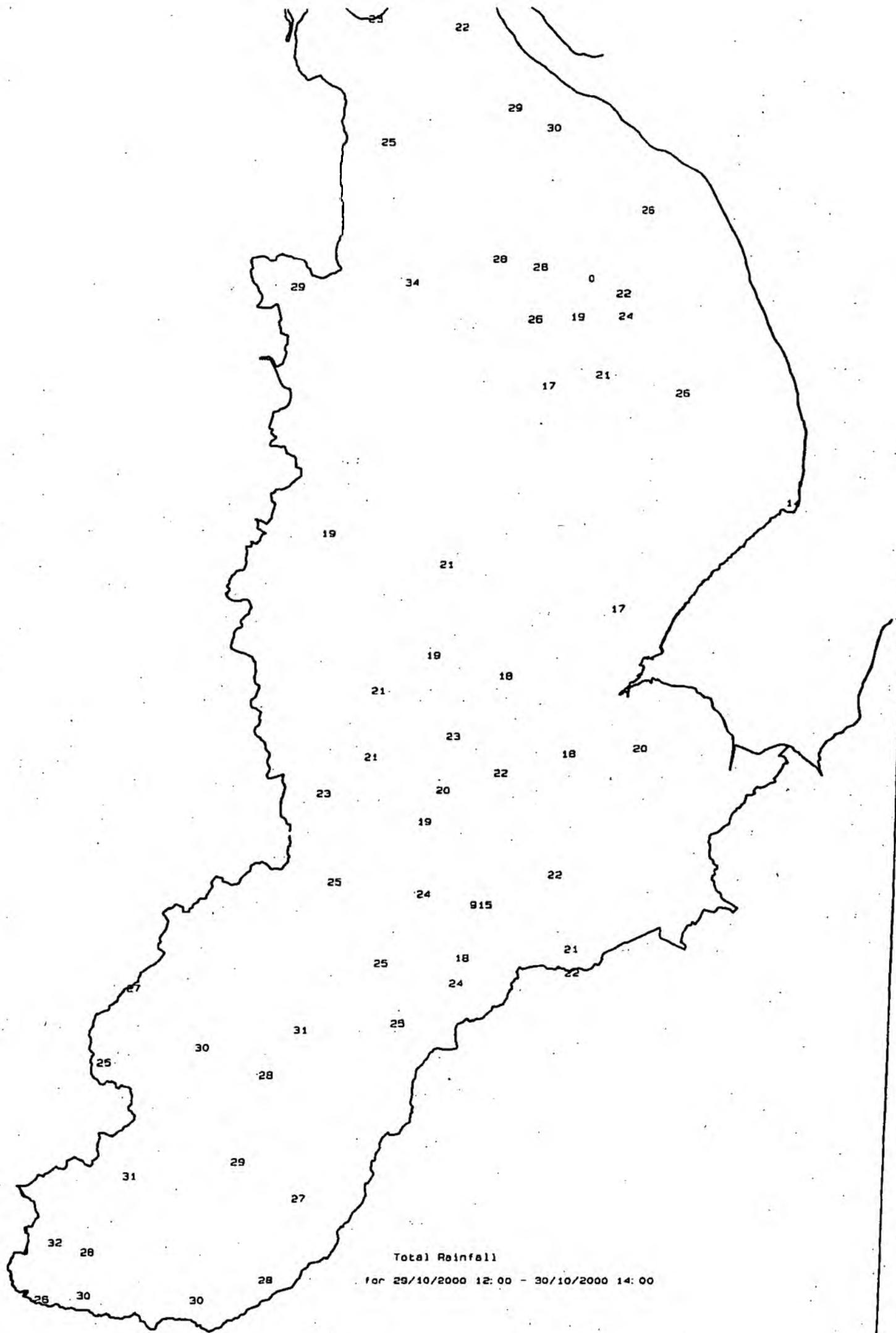
5-31



Total Rainfall
for 05/11/2000 15:00 - 08/11/2000 15:00

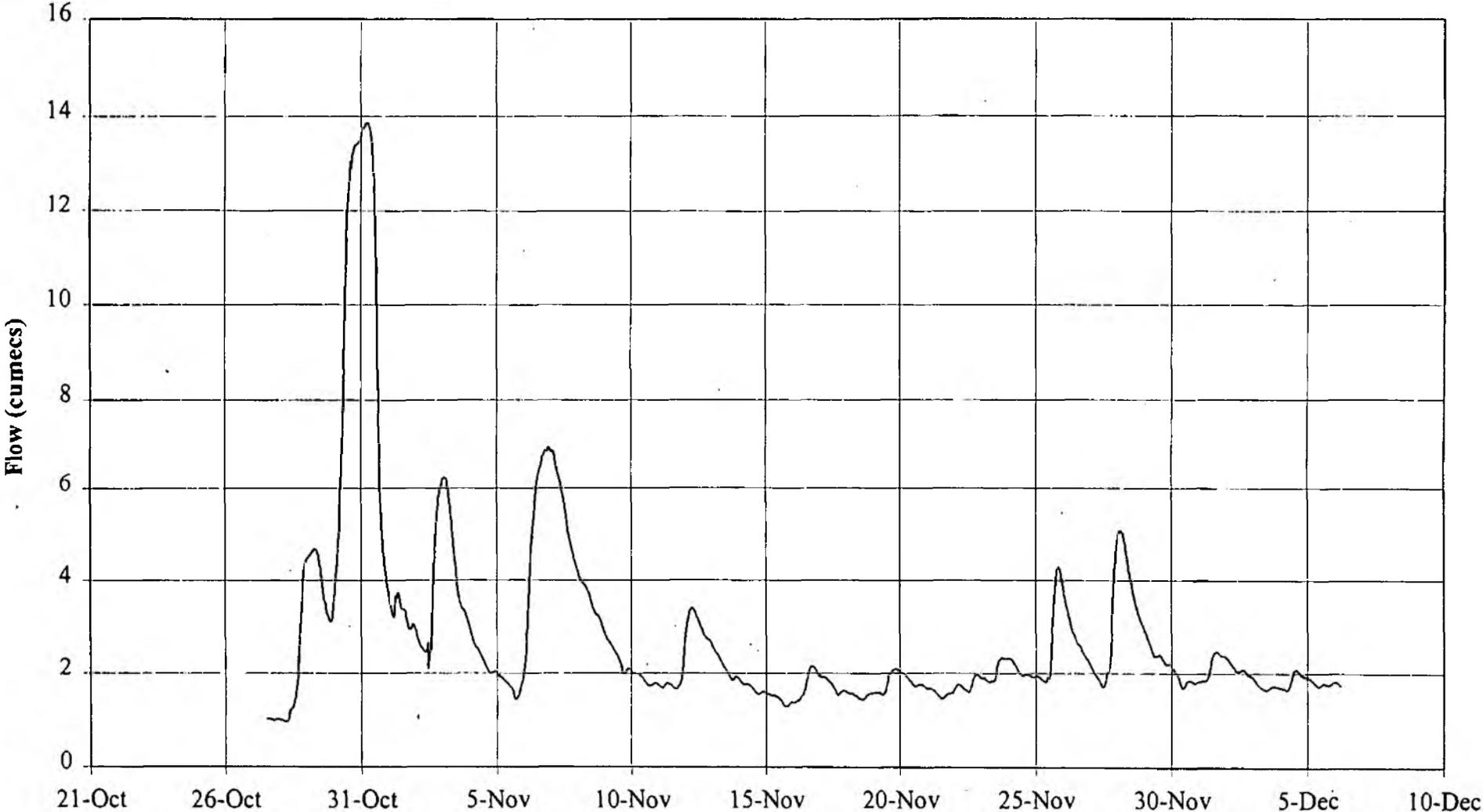


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for 05/11/2000 15:00 - 06/11/2000 08:00

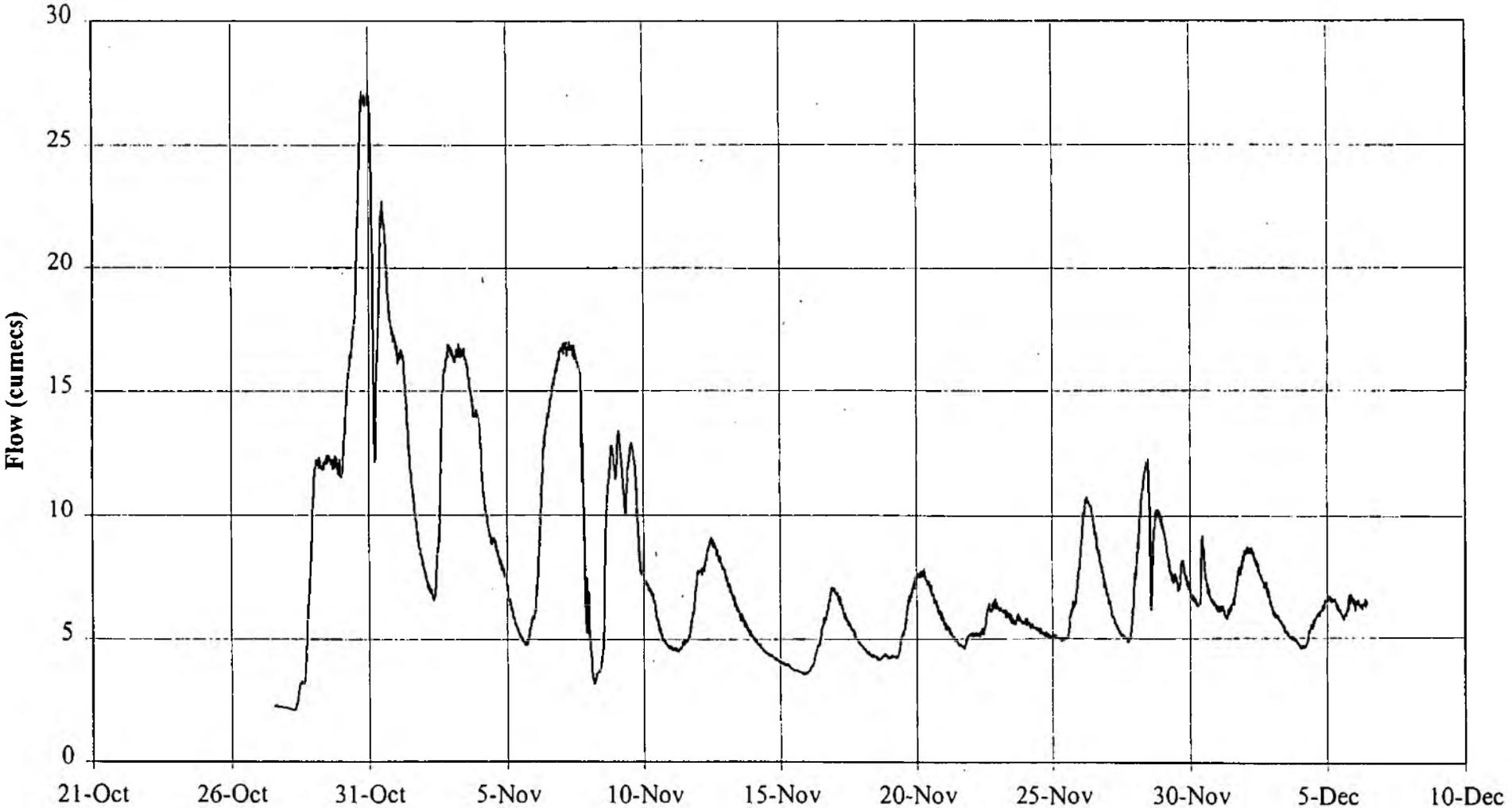


Total Rainfall
for 29/10/2000 12:00 - 30/10/2000 14:00

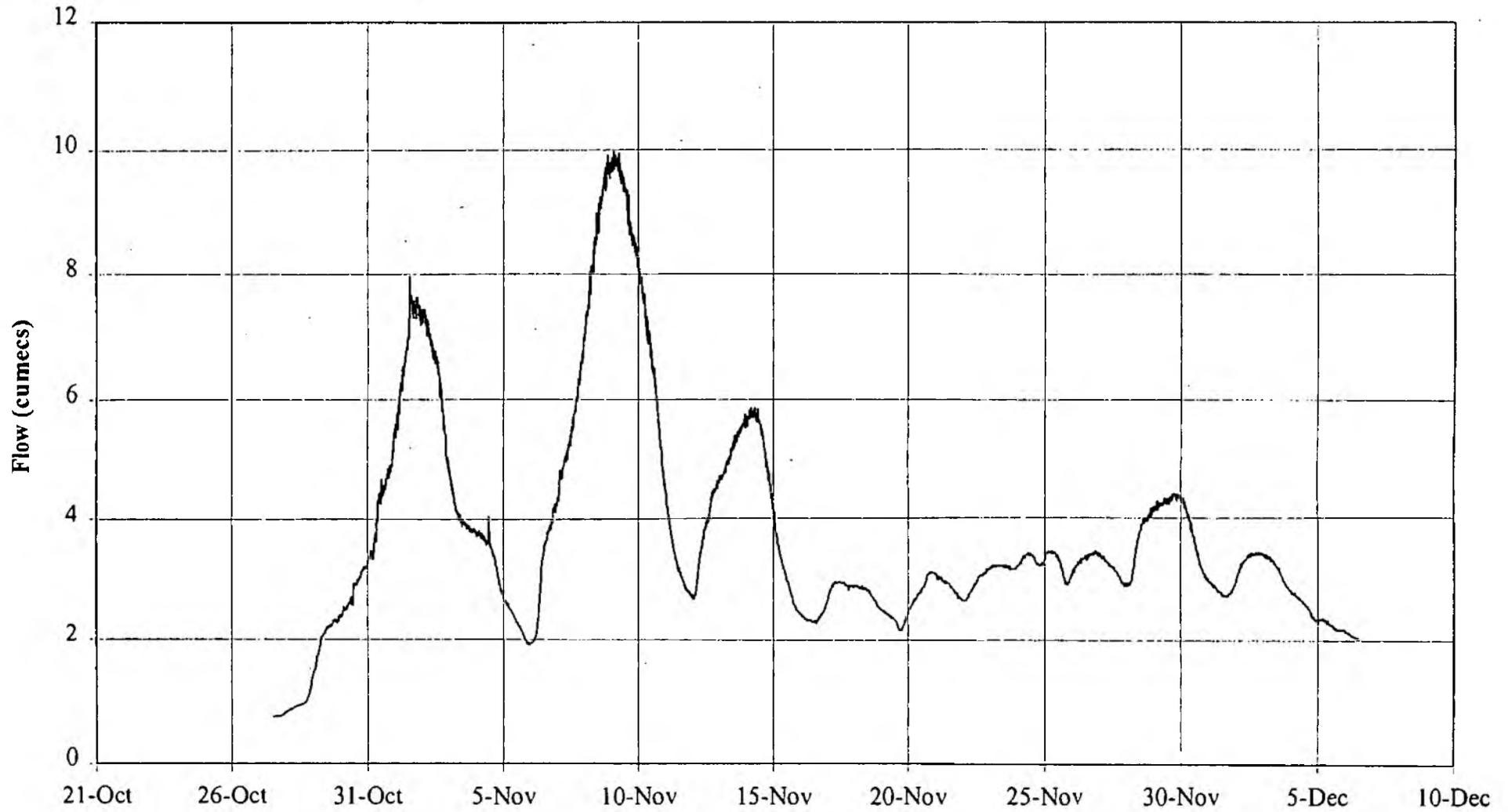
Tempsford Flow November 2000



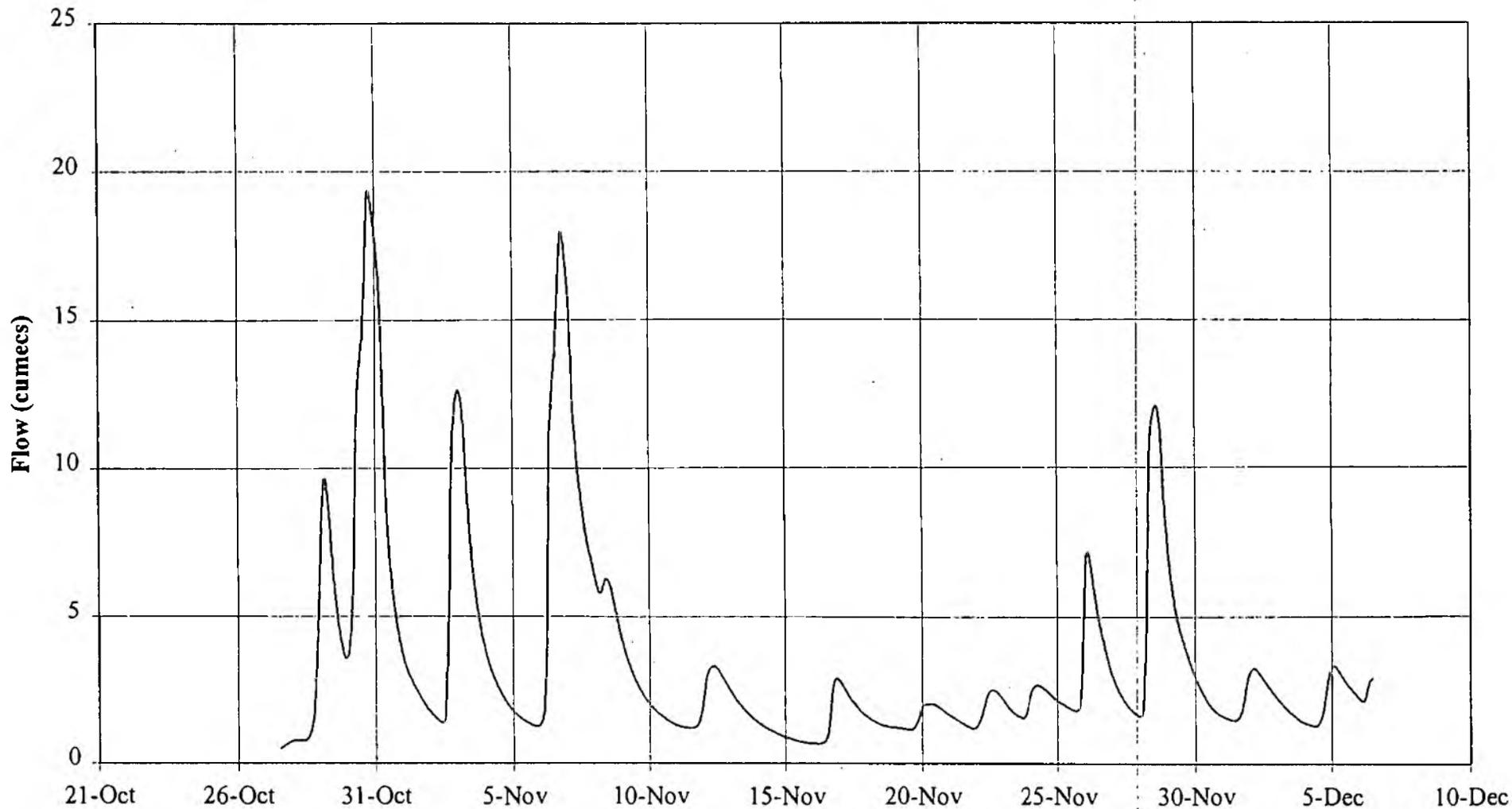
Willen Flow November 2000



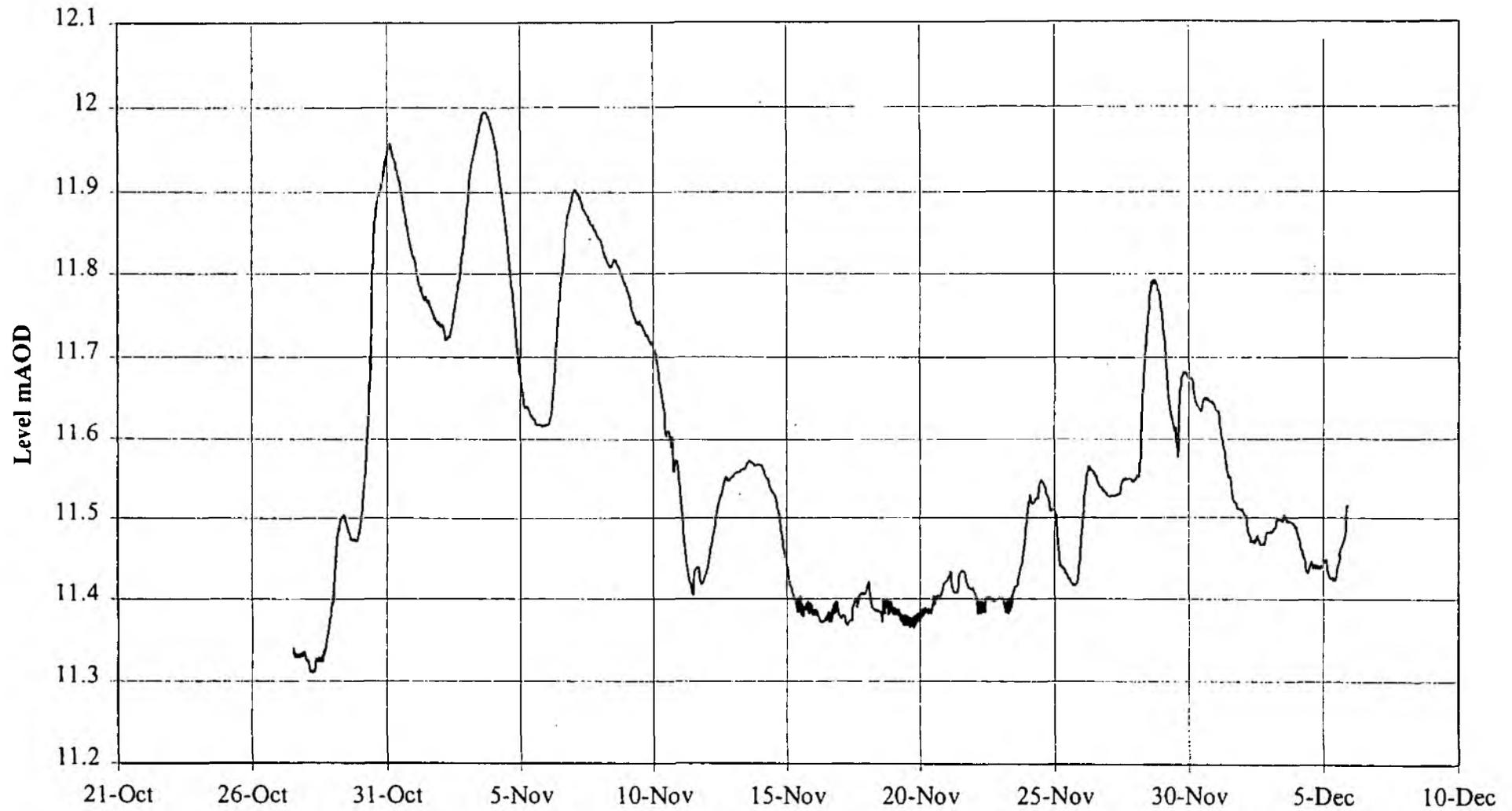
Rectory Flow November 2000



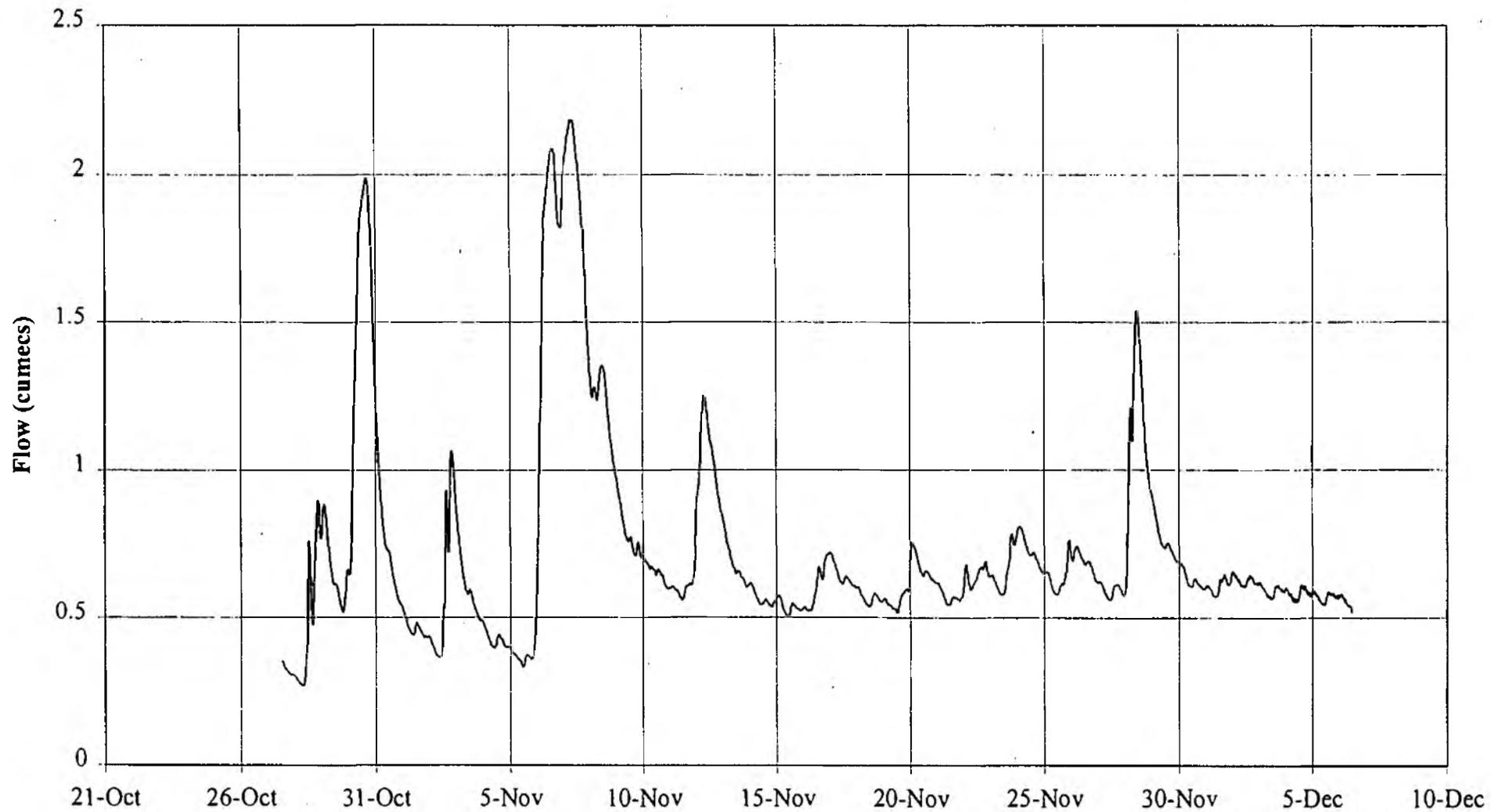
Hail Weston Flow November 2000



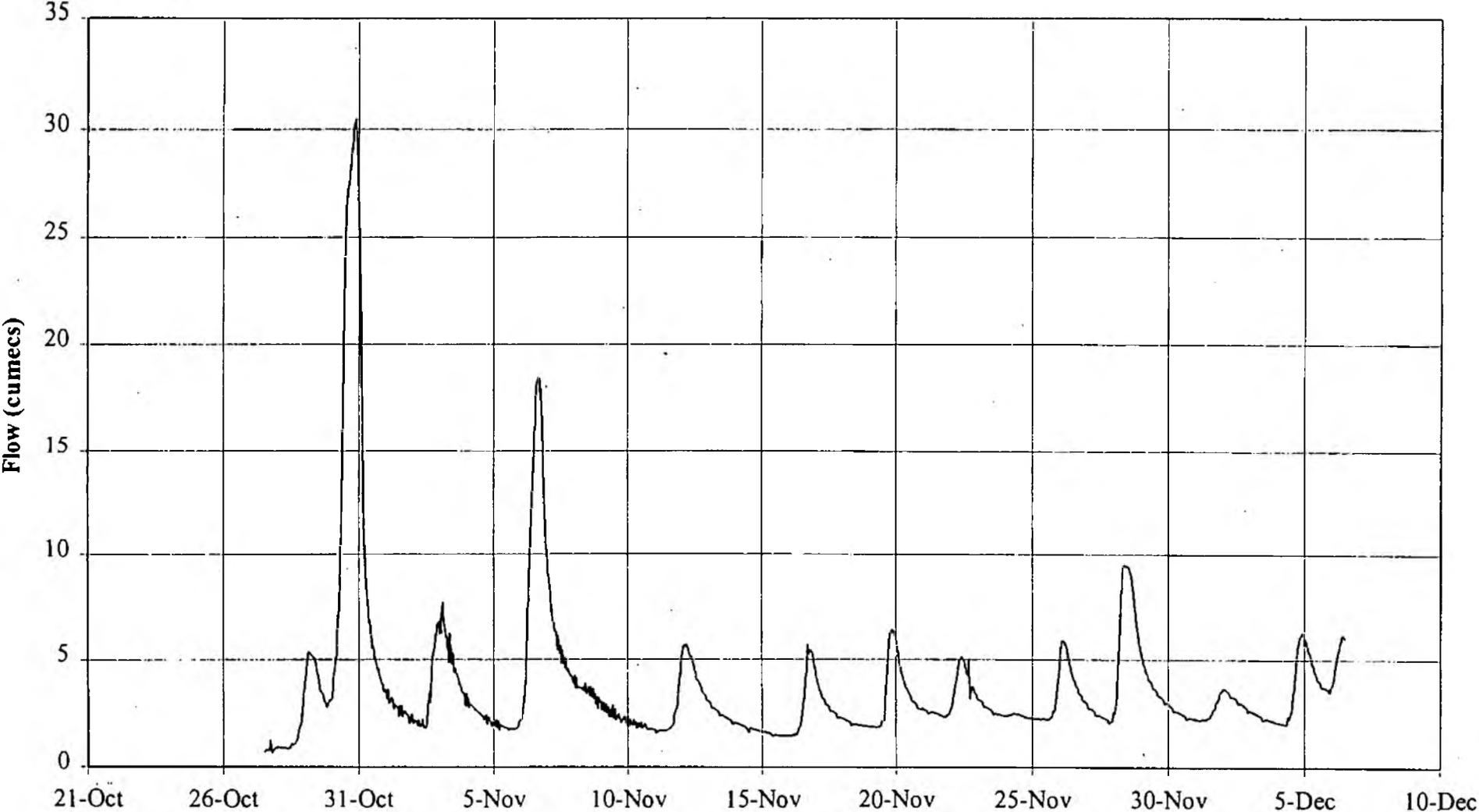
Offord Level November 2000



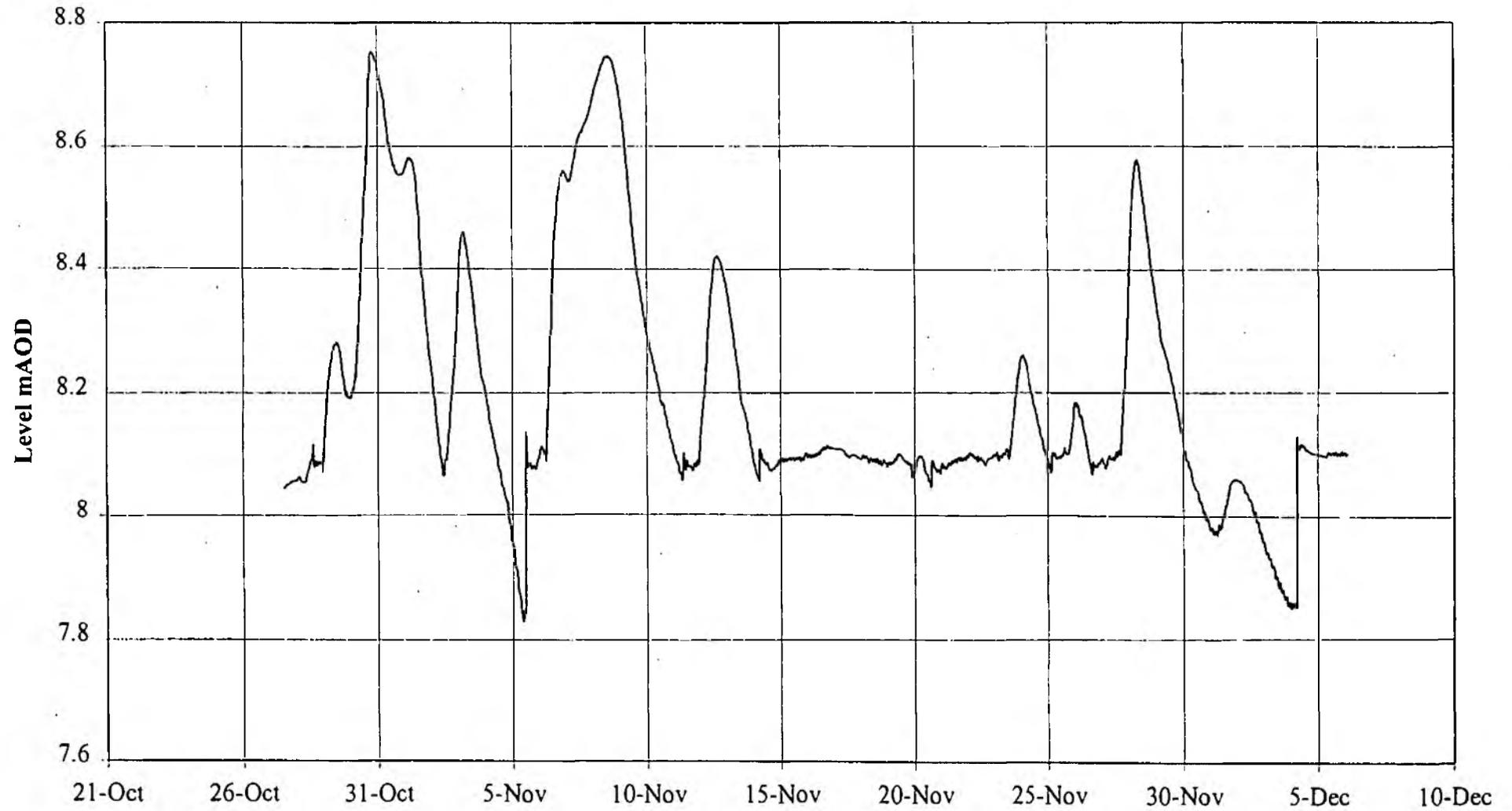
Fordham Flow November 2000



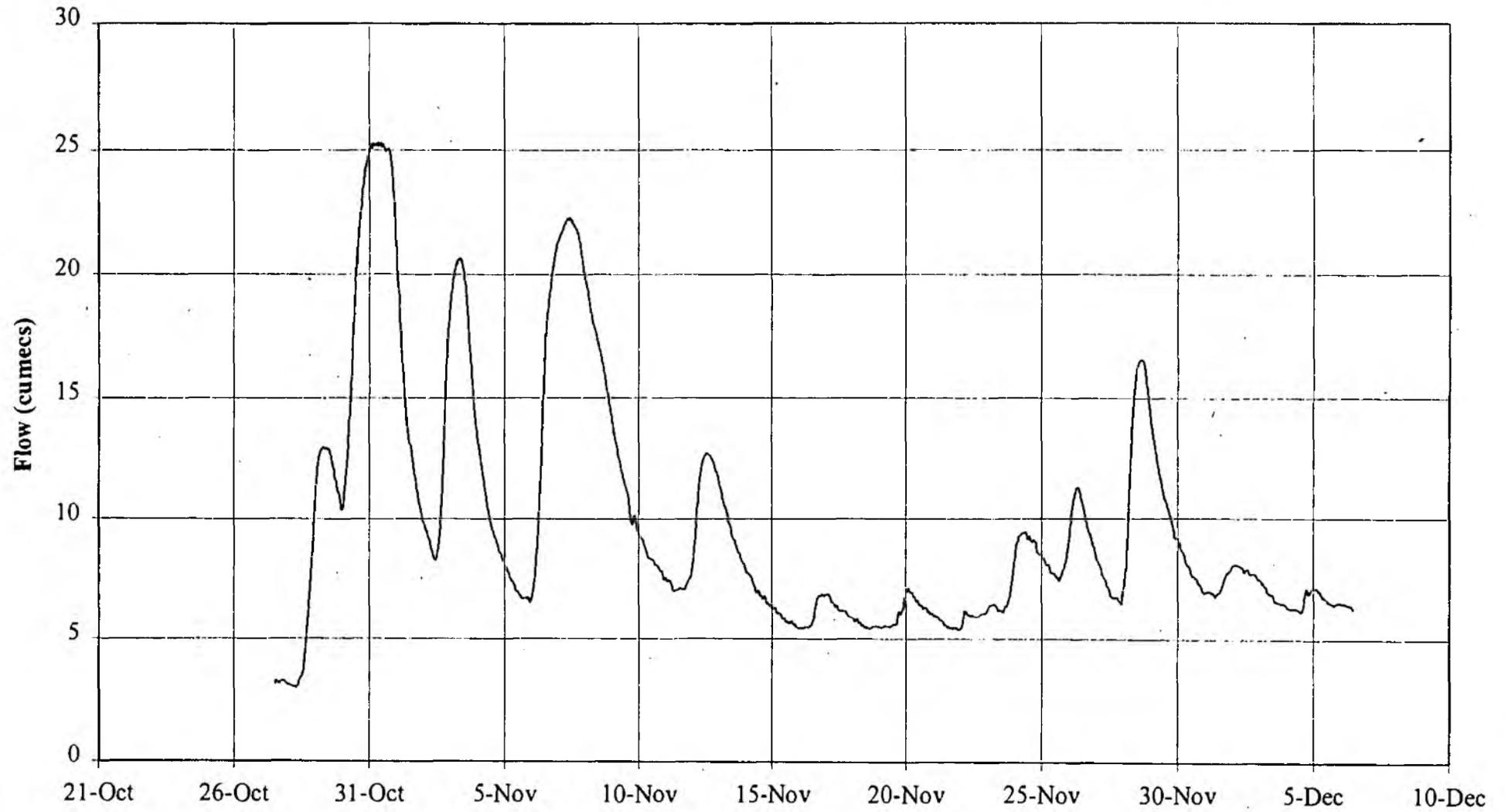
Cappenhams Flow November 2000



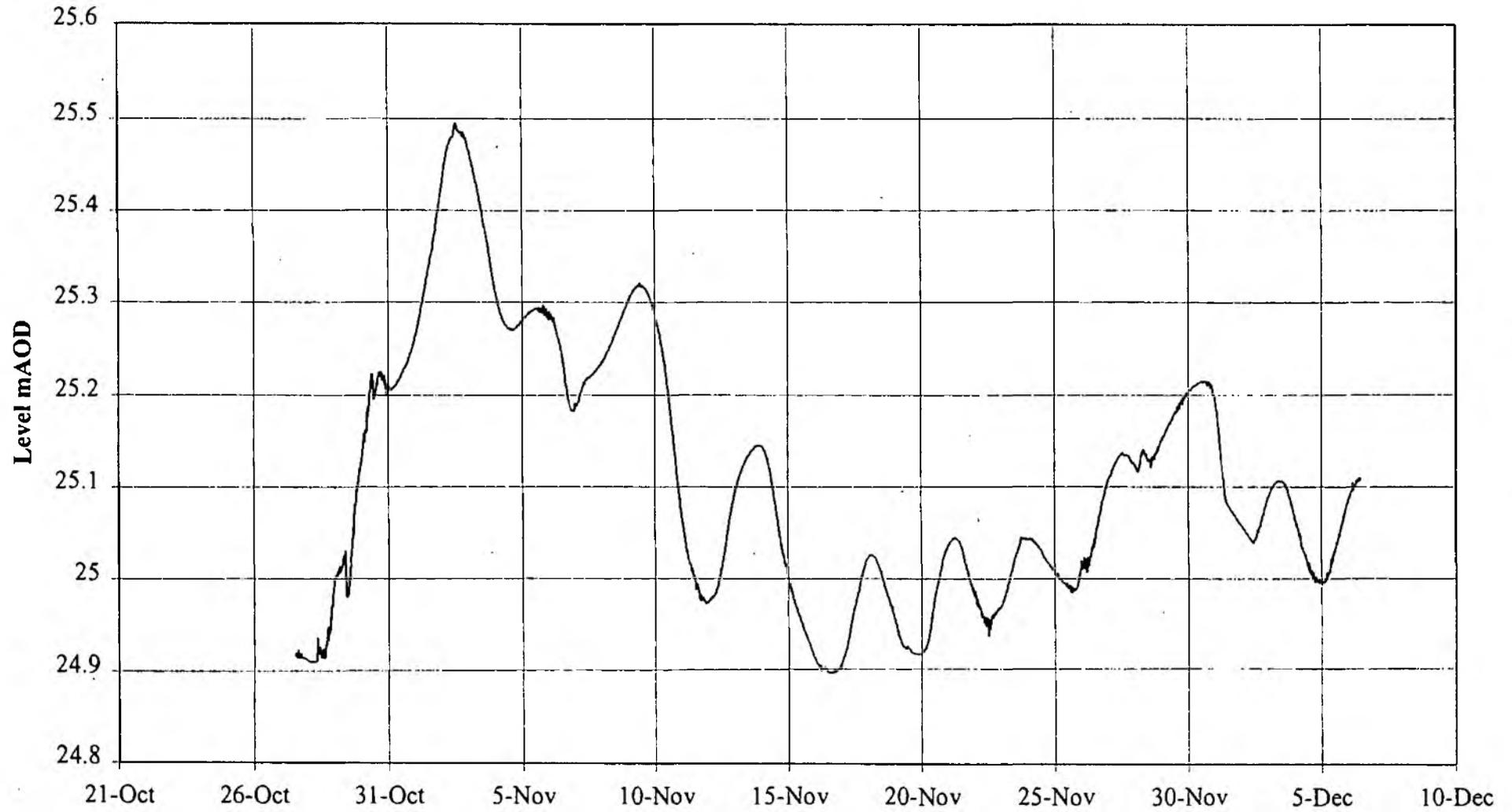
Byrons Pool Level November 2000



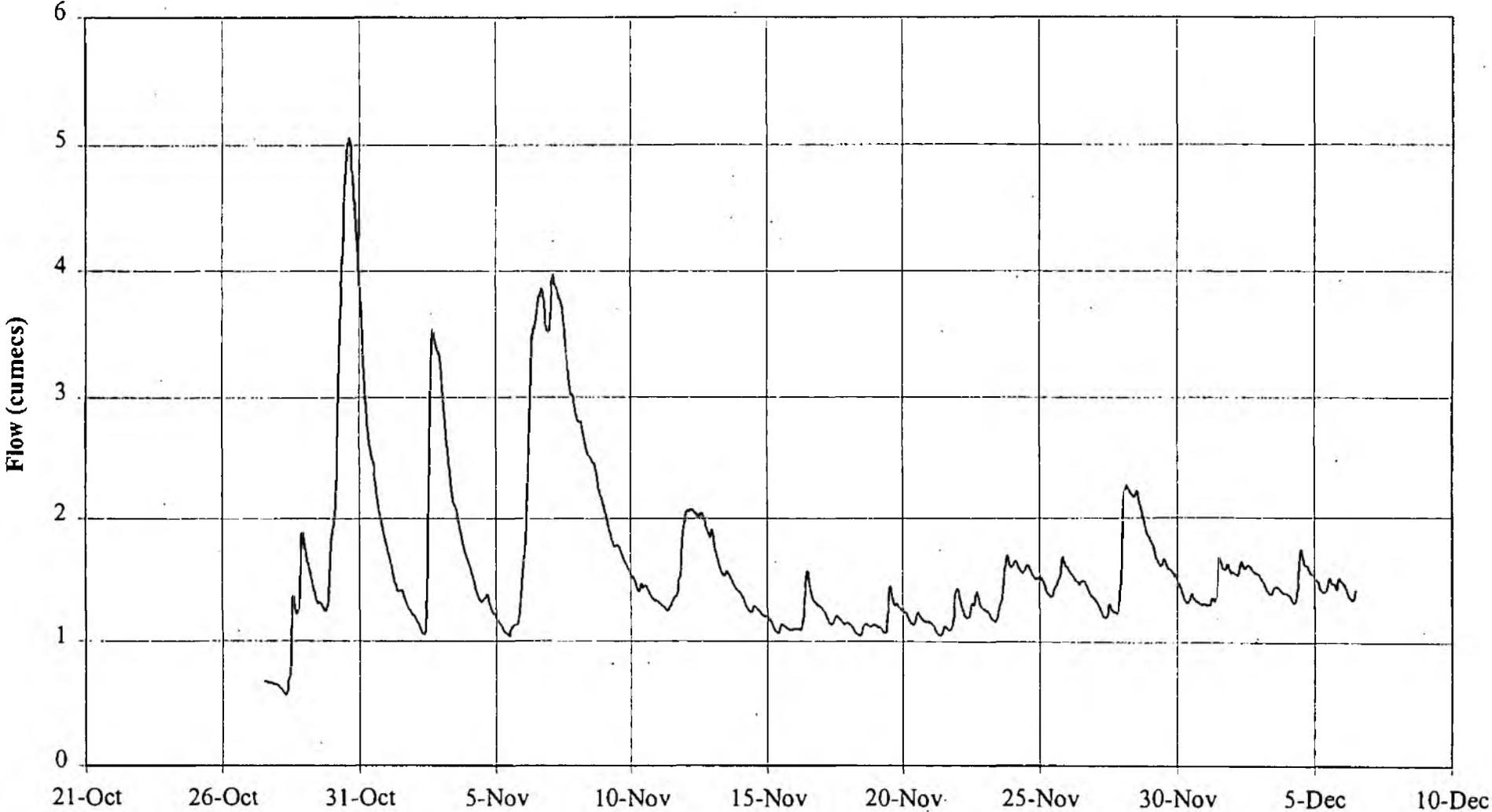
Blunham Flow November 2000



Bedford Level November 2000



Arlesey Flows November 2000



CHAPTER 6 - EMERGENCY RESPONSE

6.1 MAJOR INCIDENT PLANS

During the report period no major incident plans were activated. In Anglian Region the civil authorities have tended to see flooding as a risk catered for in their generic emergency response plans which cover a wide range of possible incidents. The exception to this is the town of Northampton and the county of Norfolk where specific flood plans have been written.

6.2 GOLD/SILVER CONTROLS

The magnitude of the event in Anglian Region was such that full time Gold Controls were not deemed to be necessary in any of the counties in the Region. Part time controls at Gold Level were opened in Cambridgeshire and Bedfordshire, but by joint agreement an Agency presence was by invitation to some of the more important meetings. Silver Controls were opened in Northampton and Lincoln. In Lincoln liaison was maintained at Silver level by regular telephone contact and fax. During the period when a Severe Flood Warning was in force for the River Nene, downstream of Northampton, an Agency Officer was in attendance in the Northampton Silver Control. Although staff have been identified to operate in joint service controls there are concerns about the number of personnel that would be required to staff all possible controls during widespread events. Anglian Region takes the Agency liaison lead in 8 counties. It would be extremely difficult to achieve 24 hour cover in 8 Gold Controls and 8 or more at Silver level and alternative ways of setting up effective lines of liaison without the need for full time attendance at control centres is currently being sought.

Table 6.2.1 Gold/Silver Controls

County	Major Emergency Plan Activated	Gold/Silver Open	Agency Attendance
Northamptonshire	No	Silver - in Northampton Town	Via Telephone and fax. In person on 29/10/00
Lincolnshire	No	Silver	Via Telephone and fax.
Cambridgeshire	No	Gold (No fulltime presence) Silver	Yes. For regular meetings. For Alconbury Brook and River Kym flooding
Bedfordshire	No	Gold (No Fulltime presence)	Yes. For regular meetings.

6.3 DIRECT SERVICES GROUP

Emergency response from Anglian Region was dealt with by the Direct Services Group (DSG) which forms the basis of the Emergency Workforce (EWF). A key issue already identified is that the size of the EWF is based on the so called Noble number which identifies the number of staff required to deal with a ten year flood over the

first 12 hours. Our experience from this and other events since 1998 shows that flood events are becoming more prolonged and more widespread. The numbers in the EWF now need to be reviewed against current needs and both Agency and public expectations.

Table 6.3.1 Direct Services and Emergency Workforce Resources Allocated to Response.

Location	Function	Duties	Number of Personnel	Hours Worked
Northern Area	Manual Workforce	Emergency Response/Operations	97	5100
	DSG Staff	Operations	11	
Central Area	Manual Workforce	Emergency Response/Operations	78	5392
	DSG Staff	Operations	9	540
Eastern Area	Manual Workforce	Emergency Response/Operations	150	9111
	DSG Staff	Operations	17	1350
Total			362	21493

Table 6.2.3 DSG Mutual Aid - Hours Worked

Direct Services Group	Number of Personnel	Hours Worked
Emergency Workforce operating in Midlands Region	22	393
Emergency Workforce operating in North East Region	14	265
Sandbag production	61	2350
Total	97	3008

6.4 PLANT AND EQUIPMENT

6.4.1 Sandbags

Over 24,000 filled sandbags were provided to other Agency Regions during the first week of November 2000. This operation continued almost without stop for 5 days and was possible due to the availability of sufficient quantities of sandbags and a sandbagging machine. Delivery of the filled sandbags was undertaken by an external haulage company. This was a more effective deployment of the workforce than sending them to North East Region to deliver filled sandbags. In all over 35,000 sandbags were used during the report period.

6.4.2 Plant

One 6 inch pump was provided to North East Region. Arrangements were made to supply two others to Midland Region but this request was subsequently cancelled.

6.4.3 Inter-Regional Assistance

Co-ordination of resources was problematical in the early stages of the event with local contacts being made between functional managers in individual Regions. The need for co-ordination through the National Incident Room in an event of this scale is

vital and at an early stage in the event. Currently there is a danger of multiple requests being made to address the same need.

Northern Area DSG personnel were deployed to North East Region to assist with sandbagging operations. They were sent back from the Ridings Area at a time when the Dales Area were seeking additional personnel. Better co-ordination would have meant they could have been diverted to the Dales Area. Flood Defence staff (from Regional Head Office) were deployed on riverbank inspection in North East Region. Direct Services Group personnel provided sandbags to other regions as shown in table 6.4.1. Northern Area DSG also carried out sandbagging operations at Torksey Lock at the mouth of the Fossdyke Canal. This prevented overtopping of the flood defences from the flood peak in the River Trent that could have resulted in flooding of Lincoln.

Table 6.4.1 Inter Regional Assistance

Request	Source
Over 18,000 Filled Sandbags for North East Region	Eastern Area DSG
3,700 Filled sandbags for Southern Region	Eastern Area DSG.
1,000 Filled sandbags for Local Authorities	Eastern Area DSG.
11,000 Empty sandbags for Local Authorities	Eastern Area DSG.
2,400 Filled sandbags for Midland Region.	Northern Area DSG.
1(no) 6inch pump to North East Region	Northern Area DSG
3(no) staff to carry out Flood Defence Inspection work.	Regional Flood Defence.
10(no) men assisting with sandbagging at Gowdall in North East Region (10 hour shift)	Northern Area DSG.
10(no) men to assist raising defence level at Torksey Lock.	Northern Area DSG.

6.5 PARTNER ORGANISATIONS

6.5.1 Response

Throughout the event very close links were maintained with the Agency partner organisations, which also have a role to play in responding to flood emergencies. Largely through Silver controls but to some extent through Gold, the Agency was able to provide advice and guidance to those involved in the evacuation of residents from flood threatened areas.

At Alconbury the Police provided advice and assistance to the public and the Bedfordshire and Luton Fire and Rescue Service dealt with 15 calls for assistance between 30 October and the 8 November. In some locations local authorities staff sandbagged vulnerable sites. For example Cambridge City Council built a sandbag wall in front of properties in Riverside, Cambridge. Huntingdonshire District Council mobilised their Emergency Control Centre to respond to the flood risk at Alconbury and from the River Kym.

6.6 PROPERTY EVACUATION

Although some properties were affected by flooding in the Region, only the following cases of evacuation have been recorded:

Table 6.6.1 Property Evacuation.

Location	Details
Billing Aquadrome	The local emergency plan for Billing Aquadrome was invoked with approximately 200 residents being evacuated from caravans as a precaution in line with the plan.
Alconbury	2 Houses evacuated. 1 on the advice of the Police the other the residents self-evacuated.
Chelmsford	5 Houses evacuated.

6.7 ISSUES ARISING

- a) Requests for Mutual Aid were not co-ordinated by the National Incident Room in accordance with Emergency Procedures. This led to unstructured communication links, confused messages and delays.
- b) Some staff were involved in unfamiliar emergency works. e.g. constructing sandbag defences.
- c) Deployment of the emergency workforce was required over very lengthy periods.
- d) Direct Services Managers identified concerns about the possible impact of the Working Time Regulations on emergency works.
- e) If many Gold/Silver Controls had been set up there would have been insufficient Agency personnel to attend them.
- f) Health and Safety of staff involved in emergencies, including those providing mutual aid must be paramount.

6.8 RECOMMENDATIONS

- a) NEMG to review arrangements for provision of Mutual Aid and to ensure that procedures are followed.
- b) Staff training to be arranged. A manual of good practice to be considered.
- c) Review of Noble numbers required.
- d) Clarification of position in respect of Working Time Regulations required from National Head Office.
- e) Identify all potential Gold Control representatives. Provide on-going training for identified staff.
- f) Provide Health and Safety training for management to cover emergency working.

CHAPTER 7 - PUBLIC RELATIONS

7.1 LINKS TO THE MEDIA/COVERAGE BY THE MEDIA

- 7.1.1** Overall the media were extremely supportive to the Agency in promoting flood warnings in place and advice to the public. Awareness among the media itself of this significant issue is high following the pro-active work put in place prior to Flood Action Week and the launch of the new flood warning code system.
- 7.1.2** During the events the Press Office issued news releases, minimum twice a day, to provide a regular update to all media of flood warnings in place. Regular slots were pre-arranged with key radio stations to provide breakfast and drive time updates.
- 7.1.3** A photo opportunity at Whittlesey Washes with Sir John Harman was arranged during his visit to the Region. This resulted in three radio and two TV interviews by the Chairman.
- 7.1.4** The total number of media requests (newspaper enquiries, TV and radio) handled by the Press Office was 308.

An appendix of press cuttings is available on request.

- 7.1.5** A total of 223 newspaper articles were generated. The vast majority of these were favourable to the Agency, with only 6 being partially negative (comments regarding state of defences, rubbish in the river, lack of advice). A total of 49 articles gave the Floodline number in full for advice and warnings in place.

7.2 NUMBER OF INTERVIEWS BY MEDIA TYPE

The Press Office gave/co-ordinated a total of 99 broadcast interviews -

Table 7.2.1 Interviews (* = Live broadcast)

DATE	RADIO	TELEVISION
27/10/00	1	
30/10/00	20 (12*)	4
31/10/00	11 (4*)	1*
1/11/00	3 (1*)	-
2/11/00	6 (4*)	-
3/11/00	7 (2*)	1
5/11/00	1	-
6/11/00	20 (10*)	4 (2*)
7/11/00	7 (3*)	1
8/11/00	3	-
9/11/00	3 (1*)	-
10/11/00	3 (1*)	-
11/11/00	2	-
28/11/00	1	-
TOTAL	88	11

7.3 ISSUES ARISING

- a) There was a local issue regarding lack of provision of media spokespeople in one Area that resulted in a significant workload for the Public Relations team at key times during the events. Had the events been more significant, and involved extensive flooding of properties, failure of defences, co-ordination of visits from VIPs and other issues arising, then it is unlikely that the PR team would have been able to cope with the demand for media interviews without support from designated spokespeople in this Area. This has been discussed through wash-up sessions and a recommendation for resolving this has been put forward.
- b) The need to liaise closely with Press Offices in neighbouring regions was identified in order to provide a seamless service to media covering more than one region. Up-to-date information on current warnings and any local issues in adjoining areas is required by Press Officers and designed spokespeople.

7.4 RECOMMENDATIONS

- a) Each Area Base Controller should have media training and act as the media spokesperson for specific requests over and above those routine enquiries which can be dealt with by Regional PR staff.
- b) Public Relations to set up lines of liaison.

CHAPTER 8 - INCIDENT SPECIFIC

8.1 MAJOR INDUSTRY

There was no disruption to major industry caused by the flooding over the period of the report.

8.2 INFRASTRUCTURE

Some disruption was caused to road traffic on roads crossing washlands, e.g. the Hundred Foot Washes and Whittlesey Washland. As the washlands filled long detours for road users became necessary. Some disruption also occurred on other minor roads alongside watercourses throughout the Region

8.3 LEGAL RECOMMENDATIONS

None

8.4 STANDARD LETTER

The following letter was sent to Chief Executives of Local Authorities, Chief Constables and Chief Fire Officers in Anglian. Responses are included in Appendix F.

Our ref: F.6

Your ref:

Date: 05 January 2001

Dear

REVIEW OF RECENT FLOODING

Following the serious flooding which has affected many parts of the country over recent weeks, the Environment Agency is now reviewing its own operations to identify:

- What worked well
- Where improvements can be made
- Best practice which can be shared
- Any issues concerning interfaces with the emergency services and other participating organisations.

Although you may already have been asked to comment on aspects of our operational interfaces, it would be particularly helpful to hear your views about flood responses under the above headings and indeed any other comments you wish to make.

The Agency is presently preparing a report on the flooding for consideration by government ministers and unless you indicate otherwise, it is intended to include your response to this letter in an annex to the report. As the work has to be completed by early February a response by the end of January would be much appreciated.

I look forward to hearing from you.

Yours sincerely

R A DAVEY
REGIONAL FLOOD WARNING OFFICER

APPENDIX A

DEVELOPMENT IN THE FLOODPLAIN

1. Age of Properties Flooded in Anglian Region - October/November 2000

	Flooded Properties built in last 5 Years	Flooded Properties built in last 6-10 Years	Flooded Properties built in last 11-20 Years	Flooded Properties built 20+ Years Ago	Flooded Properties built against Agency Advice
Northern Area	1	0	0	18	No records available.
Central Area	0	0	0	24	0
Eastern Area	0	0	1	57	0

2 All flooded properties are in "At Risk" locations shown on Flood Risk Area maps.

3 Land Allocated for Development in the Floodplain.

Area	Comment
Northern	Billing Aquadrome Leisure development. Agency objections have requested a Strategic Flood Risk Assessment for the development.
Central	None known.
Eastern	None known prior to this event. However there has since been a pre-planning development proposal to build flats on the "island" site at Chelmsford. The proposal includes a flood alleviation channel. The Agency is not opposed in principle and will be working closely with the developers.

APPENDIX B**PUBLIC RESPONSE**

Information about the public response to flood warnings is collected by the British Market Research Bureau. Interviews with occupiers of flooded properties is the main means of getting information. Interviews are being carried out in locations where more than 100 properties were affected. As only small isolated groups of properties were flooded in this Region, interviews will not be carried out. The following information is provided by Central Area indicating activities undertaken by others in response to the flooding:

At Buckingham, The Town Council arranged for sandbags to be available and put staff and contractors on standby.

At Kimbolton in Cambridgeshire, the Parish Council monitored the rate of rise of the flood water.

At Stonely in Cambridgeshire the Flood Warden closed the floodgates which were installed by the Agency in 1997.

At Great Staughton in Cambridgeshire, the Parish Council contacted the owners of vulnerable properties.

At Alconbury Weston in Cambridgeshire, Parish Councillors contacted parishioners living close to the Alconbury Brook and advised them to remove furniture, etc. from ground floor level and to park their vehicles in parts of the village which does not flood. Residents of one property reported being evacuated by the Police

At Alconbury in Cambridgeshire, the Parish Council's Self-Help Group members kept a check on water levels. Some residents who were at risk went to stay with friends. Most residents in danger moved furniture and valuables to higher levels. At least one property self evacuated.

At Hemingford Grey in Cambridgeshire, the Parish Council put their emergency plans into operation and monitored river levels. They also assisted in repairing the flood bank and placing sandbags.

At Mill Quay, St Ives in Cambridgeshire, the Self Help Group advised all 22 house owners of the warnings.

APPENDIX C**ORGANISATIONAL ISSUES**

During the year 2000 the Agency carried out the Changing Needs in Flood Defence Review (CNFDR) which identified new operational structures and roles for staff in the Flood Defence function. The Agency has implemented the recommended structures and roles.

In Anglian Region CNFDR has seen the formation of Enforcement and other teams created from what were previously Operations staff operating out of Catchments. This means that the number of staff available to deal with incidents on the ground has fallen as the Enforcement team roles cover much wider geographic areas and different work tasks. Difficulty in recruiting for posts and vacancies caused by staff movement due to CNFDR has in some Areas exacerbated the shortfall of experienced staff.

Creation of the new roles through CNFDR has seen an increase in the pool of staff available for manning Area Incident Rooms and the roles of staff during emergencies are now clearer.

CNFDR has also resulted in an improved awareness of Agency and others responsibilities for assets on watercourses and the maintenance of the same.

The role of Flood Monitoring and Forecasting is moving from the Areas to Regional Head Office and this along with the introduction of the Anglian Flow Forecasting and Monitoring System (AFFMS) should see a clearer division of responsibilities for staff than at present.

Whilst still in the early phase it is difficult to give a final judgement on the effectiveness of the CNFDR package. However it has produced clearer roles and responsibilities for staff and created common operating practices across the country. This is very much welcomed.

APPENDIX D

ECONOMIC IMPACTS

1. Cost of Emergency Response

Emergency response costs are given in Table 1 below for the period 27 October 2000 to 30 November 2000.

These costs are for responding to floods and high flows in Anglian Region. They do not include the cost of any assistance given to other Regions or costs incurred by other parties. Assistance to other Regions was provided on a re-charge basis and will be included in the appropriate Regional flood reports.

Table 1 Emergency Response Costs 27/10/00 to 30/11/00

LFDC	Response Costs [£000's]	Floodline [£000's]
Essex	60	-
Gt Ouse	75	-
Lincoln	90	-
Norfolk/Suffolk	10	-
Well & Nene	30	-
Anglian Total	265	47

2 Cost of Emergency Repairs

Emergency repair costs for Agency defences are given in Table 2 below for the period 27 October 2000 to 30 November 2000.

The table identifies repair costs by local flood defence committee and gives the location and nature of the works undertaken.

Table 2 Emergency repair Costs 27/10/00 to 30/11/00

LFDC	Cost [£000's]	Location and/or River Affected	Defence Type	Nature of work done and why
Welland & Nene	9	Duston, Northampton	Bank	Low level containment bank constructed
	2.5	Deeping, St James	Earth Bank	Repairs
Sub total	11.5			
Great Ouse	0.5	Hemmingford Grey	Earth Bank	Low level containment bank constructed
	14	Soham Lode	Earth Bank	Overtopping halted by sandbags in 3 locations
	5	Ickburgh	Earth Bank	Overtopping halted by sandbags
	6	R Nar Kings Lynn		Temporary pumps installed at tidal outfall
Sub total	25.5			
Essex	0.5	Lamarsh (Stour)	Earth Bank	Erosion repair
	1.7	Cattawade Marsh (Stour)	Earth Bank	Erosion repair
Sub total	2.2			
Anglian Total	39.2			

3. Extra Flood Defence Schemes Identified

The Regional Flood Defence Committee has a substantial 'needs driven' capital investment programme for Flood Defence. Programmed expenditure for 2000/01 is over £31 millions and the 10-year Long Term Programme identifies in excess of £368 millions for future flood defence works. Needs are based upon a knowledge of individual river catchments, asset surveys and previous flooding incidents. New schemes are identified as understanding and knowledge develops.

Following the events over the period between 27 October 2000 and 30 November 2000 the works identified in Table 3 have been proposed for inclusion in the capital programme. Some schemes are new. Others, following changes in MAFF priorities, may now be considered for grant aid.

Table 3 Flood Defence Schemes

Scheme Name	LFDC	Purpose of Scheme	New Scheme / Funding
Spaldwick & Ellington	Great Ouse	Flood defence improvements	Existing scheme now proposed for MAFF grant aid
Telemetry Improvements	Great Ouse	Flood warning improvements	New scheme, MAFF grant aid programme
River Level Outstations	Norfolk & Suffolk	Flood warning improvements	New scheme, MAFF grant aid programme
River Level Outstations	Essex	Flood warning improvements	New scheme, MAFF grant aid programme
Geddington	Welland & Nene	Flood defence improvements	Existing scheme now proposed for MAFF grant aid

APPENDIX E

Flooding between 1998 and 2000 in Northern Area

Incident Room Open	Flooding
27/10/98 - 9/11/98	No reported property flooding from main river .
25-26/12/98	No reported property flooding from main river
4/1/99	No reported property flooding from main river
16/1/99 - 26/1/99	No reported property flooding from main river
9/3/99 - 11/3/99	Report of property flooding at Newton (north of Bourne) from non-main river. Breach in the South Forty Foot bank near Pinchbeck - no property flooding
2/6/99	No reported property flooding from main river
24/12/99 -27/12/99 3/4/00 - 8/4/00	Chalets at Surfleet Reservoir flooded on 5/4/00 These were holiday chalets built within the R Glen floodplain at Surfleet Sluice just upstream of the tidal Welland. They are now occupied all year and are at risk when high fluvial flows occur at the time of high tides.
28/5/00	No reported property flooding from main river
4/6/00	No reported property flooding from main river

Flooding between 1998 and 2000 in Central Area

The only event worthy of inclusion occurred in April 2000. This was confined to the Bedford Ouse.

At some places the river was out of bank

1 Commercial property is recorded as having flooded in Newport Pagnall

2 caravan sites - Crystal Lakes at Fenstanton and St Neots Caravan Park flooded following evacuation

4 Red, 12 Amber and 4 Yellow warnings were issued.

Under the new 4 stage flood warning system this would have involved the issue of 1 Severe Flood Warning (Kimbolton) and 5 Flood Warnings

Two lower level events occurred; in January 1999 and December 1999. No reports of property flooding were received.

Flooding between 1998 and 2000 in Eastern Area

June 2000

4 properties flooded in Rochford (River Roach)

August 9th 1999

1 property flooded in Blundeston (Tributary of River Waveney)

June 26th 1999

1 property flooded in Edgefield (not main river)

APPENDIX F**VIEWS OF PROFESSIONAL PARTNERS**

1. Suffolk County Council
2. Cambridgeshire County Council
3. Norfolk County Council
4. Norfolk Police
5. Norfolk Fire Service
6. North Lincolnshire Council
7. Peterborough City Council



Suffolk County Council

Secretary and Solicitor



INVESTOR IN PEOPLE

Mr R A Davey
Regional Flood Warning Officer
Environment Agency
Kingfisher House
Goldhay Way
Orton Goldhay
PETERBOROUGH. PE2 5ZR

Your Reference:
Our Reference: jms
Please ask for: Mr Jeff Stacey
Direct Line/Ext: (01473) 584140
Date: 9 January 2001

Dear Roy,

REVIEW OF RECENT FLOODING

Thank you for letter of 5 January to my Chief Executive, she has asked me to reply on her behalf.

We were fortunate that Suffolk suffered only minor disruption and individual properties that were flooded. However, we took the opportunity to hold a debrief to see what lessons there were for future events. We found that we were happy with the way in which the Environment Agency distributed warnings and the Local Authorities had been prepared to meet large scale evacuations. However, the reality is that these arrangements did not meet the needs of the majority of people who suffered flooding.

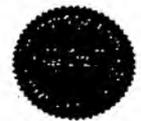
Whilst not ignoring the risks of tidal flooding, inland flooding in the county will never be of the magnitude experienced in other parts of the country. Discussion consequently focused on how we could meet public expectation for assistance in low level flooding situations. It was concluded that the best way to protect properties is for the owners to be aware of the measures they can take and implement them themselves. It is proposed to run a number of awareness days where the public can obtain information and equipment to help them achieve this. These events will be run jointly between the Environment Agency, Local Authorities, Fire Service and others. The first detailed planning meeting will take place on 22nd January and I can provide more information following this if you wish.

Yours sincerely,

J M Stacey
COUNTY EMERGENCY PLANS OFFICER

g:\plans\lood plan\davey 9jan01.doc/hjr

- K W Stevens MA, MBA • County Secretary and Solicitor •
- St Helen Court • County Hall • Ipswich • IP4 2JS •
- Ipswich 01473 583000 • Fax 01473 214549 •
- DX No 87951 •
- E-mail pers.servs@secsolr.suffolkcc.gov.uk •



Telephone: 01733 742501
Facsimile: 01733 742601
Please ask for: Mrs Grant
Our Ref: SFG/SLS/Flood Review
Your Ref:

PETERBOROUGH

CITY COUNCIL
COMMUNITY SERVICES

Bayard Place
Broadway
Peterborough
PE1 1HZ

DX 12310 Peterborough 1
Telephone: (01733) 563141
30 January 2001

Mr R A Davey
Regional Flood Warning Officer
Environment Agency
Kingfisher House
Orton Goldhay
Peterborough
PE2 5ZR



Dear Mr Davey

Re: Review of Recent Flooding

I write further to your letter of 5 January, which the Chief Executive has asked me to reply on his behalf and contribute to your review of operational services with regard to flooding.

After consulting with relevant officers I would make comments as follows :-

- (i) No flooding to properties in Peterborough was experienced
- (ii) We received good accurate flood alerts/warnings which enabled us to reassure those at risk about the likelihood of flooding
- (iii) Overall, we were happy with the advice we received

I am happy for you to include this report in the annex to your report and note that we have met your requirement for response by the end of January.

Yours sincerely

Shelagh Grant
Director of Community Services

cc: Paul Martin, Chief Executive
Trevor Gibson, Head of Environmental Health and Public Protection
Fred O'Grady, Emergency Planning Officer



I trust that this is the information you require. Should you require any further assistance, please do not hesitate to contact me.

Yours sincerely,



Ian Cameron

Assistant Director – Environmental Health & Trading Standards

Copy to Geoff Popple – Assistant Director – Highways & Transportation

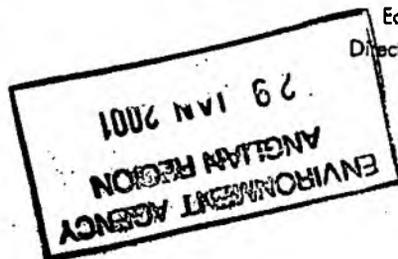
PP

When telephoning please ask
for Mr. Cameron on 01724 297602

Our Ref: IIC/PS/JNC

25th January, 2001

Mr. R. A. Davey,
Regional Flood Warning Officer,
The Environment Agency,
Kingfisher House,
Goldhay Way,
Orton Goldhay,
PETERBOROUGH.
PE2 5ZR



www.northlincs.gov.uk

Eddie Lodge BA, DMA, MCIET, MInst. WM, MIHE
Directorate of Environment & Public Protection
North Lincolnshire Council
Church Square House
P. O. Box 42
Scunthorpe
North Lincolnshire
DN15 6XQ

Dear Mr. Davey,

Re: Review of Recent Flooding

Further to your letter dated 5th January 2001 regarding the above I would comment as follows

1. What worked well?

Our tactical and operational liaison with staff at the Environment Agency worked well. Despite more intense pressure in other areas that they were dealing with, their staff were very helpful and provided accurate advice and predictions consistently. It was certainly useful to have a direct-dial contact telephone number rather than having to go through the somewhat slower process of the Helpline.

On the ground, we received positive reports about the EA's operatives and our own staff working well together. There was one reported incident of a negative attitude by a member of the EA's staff but this was an isolated problem and certainly not typical.

Our communications worked well, particularly the provision of regular press briefings and sit reps to key Members and officers.

Liaison between internal Directorates worked well (with the exception of the minor initial breakdown in communications with Social Services).

Establishing a highly visible on-site presence quickly in affected and potentially affected areas provided some reassurance to residents and also meant we could react to incidents quickly as they developed.

The establishment of a dedicated information line telephone number was successful and enabled us to provide advice to callers quickly.

Wash-up meetings held shortly after the incident enabled key positive and negative issues to be highlighted and actions to improve our systems to be implemented (see below).

2. Where improvements can be made

Although the flooding problem in North Lincolnshire was relatively small scale, some of our resources were a little stretched and in a larger scale incident we may have been found wanting in the first 24 to 48 hours with respect to availability of supplementary pumping equipment and also sand bags.

Following a review of the management of the incident the following actions are being taken to improve the response service:

- Flood Plan to be amended to improve response plans in first 24 hours of a future incident
- Strategic stock of sand bags to be kept
- Pump to be purchased
- Separate store of emergency cones/signs etc to be established
- Consideration to be given to purchasing a sand bag filling machine
- 24 hour staff cover plans to be developed in key Directorates
- Contingency plans for supplies of blankets and other emergency equipment to be developed
- Rest centre plan to be developed (including longer term arrangements)
- Record keeping of incidents to be improved in the future, including wider use of photographic and video facilities (this will also assist with future training)
- Continued liaison with other authorities to learn from their experiences (particularly ERYC)
- Risk assessments to be prepared in respect of staff working near water

3. Best Practice which can be shared:

Please see above.

4. Interfaces with Emergency Services:

Our interface with the Fire Brigade in particular was very successful. They set up an incident room at Brigg and played a very positive role in dealing with localised problems. We were particularly impressed with their pro-active approach to establishing a good working relationship with us.

Our liaison with HEPS was good. Graham Wilkinson was regularly checking with us on the situation and providing advice.

There was little direct contact with other emergency services as the scale of the incident did not really necessitate this.



Chief Fire Officer:
R. J. Elliott, M.I.Fire E.

Fire Service Headquarters
Whitegates
Hethersett
Norwich NR9 3DN

Tel: (01603) 810351
Fax: (01603) 812261
Minicom: (01603) 223833

Your Ref: F.6 - R.A. Davey

Please ask for: Mr. D. Frost

My Ref: F2/1

Extension: 7632

31st January 2001

Dear Sir,

Review of Recent Flooding

Thank you for your letter of 5th January 2001.

During the recent weeks of serious flooding, the County of Norfolk was relatively unaffected.

Whilst we have no comments to make regarding operational incidents, we would like to record that the new flood warning system worked well for the Brigade and the Environment Agency are to be congratulated for this.

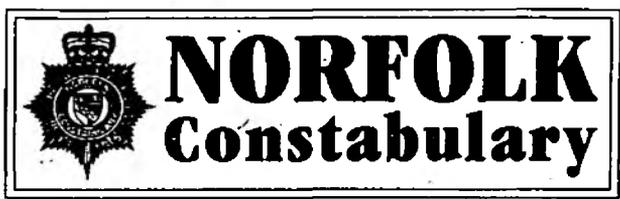
Yours faithfully,

ADO FROST
OPERATIONAL SUPPORT

Regional Flood Warning Officer,
Environment Agency,
Kingfisher House,
Goldhay Way,
Orton,
Goldhay,
Peterborough, PE2 5ZR.



INVESTOR IN PEOPLE



"Making Norfolk Safe"

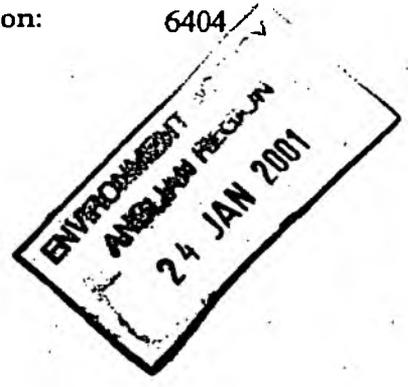
Operational Support Area,
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Norwich NR4 6DQ

Tel: (01603) 768769
Fax: (01603) 276472

Mr R A Davey
Regional Flood Warning Officer
Environment Agency
Kingfisher House
Goldhay Way
Orton Goldhay
Peterborough
PE2 5ZR

Your Ref:
Our Ref: AO/MS/AC
Please reply to:
Extension: 6404

22 January 2001



Dear Roy

Review of Recent Flooding

Thank you for the opportunity to participate in your review of recent flooding. Although we have received a considerable number of 'Flood Watches and Warnings' over this winter, you will know that, thankfully, we have not suffered any significant flood events. There are, however, a few comments we wish to make, but please bear in mind that in Norfolk it is the Police and our Local Authority partners who are currently responsible for providing the warnings to the public in respect of coastal and tidal river flooding. The Environment Agency (EA) remain responsible for warning the public of possible fluvial problems.

Firstly, I can confirm that 'flood' messages from the EA have been hitting their targets both from a timeliness point of view and going to the correct addresses.

However, the split responsibility has brought about some conflict. There are some properties at risk from both fluvial and coastal flooding and they are therefore liable to receive warnings from both yourselves via AVM and ourselves. Apart from the confusion this may cause, the situation can become further confused because AVM's are aimed at all those perceived to be at risk within the whole flood division whereas our warnings are more focussed on those actually at risk. There is also a query about those frontages for which the EA is not responsible.

Turning to facsimile message received from the EA, we have several comments and suggested improvements to make:

Cont/....



"We will answer letters within 10 working days where information is available. Where this is not possible, an explanation will be given for any delay".



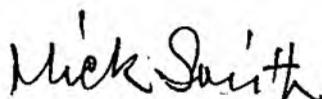
1. The new system has increased the volume of paper received and, thus, also the danger of 'crying wolf'.
2. The messages received from the EA do not appear to include all the information provided by Storm Tide Service.
3. Messages are too 'broad brush' and thereby insufficiently focussed to assist decision making.
4. It would be useful to know where in the band the 'watch' or 'warning' sits e.g. high side of watch, low end of warning.
5. Larger typeface is necessary to avoid the degradation which occurs on re transmission.

Moving to the new terminology, we believe the media need to be asked to tighten-up their use of words. We often heard headlines that told us flood warnings (or even flood alerts) were in force within our region when, in fact, flood watches were in progress. There also seemed to be some confusion on the media between Weather Warnings and Flood Warnings especially when both were in being.

Finally it is not being broadcast or otherwise notified that an 'All Clear' does not necessarily mean it is safe to return home.

I hope the above will be of use to your review and that the few anomalies above can be addressed. Should you have any queries about our comments, please give me a call on the above number.

Yours sincerely



T M Smith
Operational Planning Manager

My ref:
Your ref: F.6
Date: MB/Civil Protection
16th January 2001

Chief Executive's Unit
Chief Executive: Alan Barnish

Civil Protection Unit

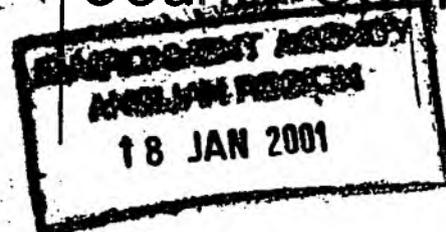
Please ask for: Mark Baker
Direct Dial No: 01223-717418
Email: mark.baker@cambridgeshire.gov.uk
ECN:

Mark Baker
Assistant Director - Business Development
and Head of Civil Protection
RES 1403
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ECN 541 7020

R.A Davey Esq
Regional flood Warning Officer
Environment Agency
Kingfisher House
Goldhay Way
Orton Goldhay
Peterborough
PE2 5ZR



Cambridgeshire
County Council



Dear Mr Davey

Review of Recent Flooding

Thank you for your letter of the 5th January addressed to the Chief Executive.

Although you are looking for operational experiences, due to the very limited flooding in the County it is difficult for us to provide this. We can however comment on the new system of Flood Warning.

Using the headings provided:

What worked well.

The new Flood Warning System does provide full and up to date information concerning the potential or actual flooding situation. The information is usually sent out well in advance of problems arising giving local authorities and emergency services ample opportunity to respond.

We have always found your team in the Control Room to be very helpful in dealing with queries.

Where improvements can be made.

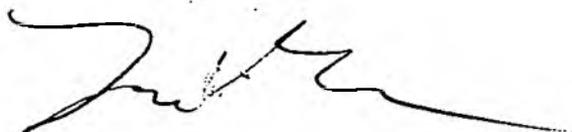
The very low threshold of 'Flood Watch' can mean that during certain periods they are being issued very frequently. The danger of this high frequency of 'warnings' is perhaps to lessen the impact of the more important 'Flood Warning' messages when they are issued.

Best Practice which can be shared and any issues concerning interfaces with the Emergency Services.

We have nothing to add.

Please do not hesitate to contact me if I can be of any further assistance.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Mark Baker', with a long horizontal flourish extending to the right.

Mark Baker
Assistant Director - Business Development and Head of Civil Protection
RES 1403



Emergency Planning

County Emergency Planning Officer
Roy Efllett

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Norwich NR1 2DH
Telephone (01603) 222016
Minicom (01603) 223833
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ECN: 541 7224 (Admin)

My Ref: RE/TMC/EP/2/3

Please reply to: Mr R Efllett
County Emergency Planning Officer

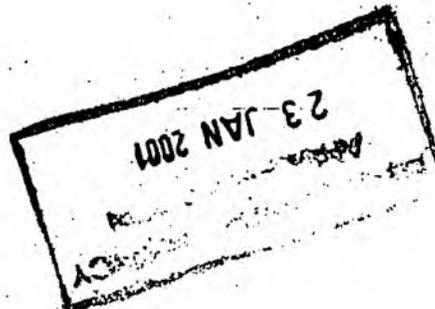
Your Ref:

Email: roy.efllett.dla@norfolk.gov.uk

Date: 22 January 2001

Direct Dial: 01603 223984

Mr R A Davey
Regional Flood Warning Officer
Environment Agency
Kingfisher House
Goldhay Way
Orton Goldhay
PETERBOROUGH
PE2 5ZR



Dear *Roy*

Re: Review of Recent Flooding

I refer to your letter dated 5 January 2001 regarding the above subject. I am sure you are aware that Norfolk was very fortunate during the recent spate of flooding and did not encounter any major/significant flooding to properties. There was some flooding to low lying land where river levels were exceptionally high and the water overflowed onto land and was held on land adjoining the rivers - many situations on identified flood plains.

I would like, however, to reply to your letter in more general terms regarding the new warning system and to say that, whilst the mechanisms for the distribution of the warnings from the Environment Agency to the Local Authorities in Norfolk is working well, there are a number of comments I would like to make. I emphasise that the following summary of comments represents the views of Emergency Planning Officers throughout Norfolk, both at the County Council and District Councils:-

1. Letter to People Living within High Risk Flood Areas

Flood warnings for people living in properties subject to the risk of flooding from the sea have received a letter from the Environment Agency asking them to provide appropriate data to enable the Automatic Voice Messaging (AVM) system to be applied to them. You will be aware that in respect of high risk properties at risk of flooding from the sea receive warnings in Norfolk from the local Police and/or Volunteers/Local Authority Flood Wardens. It would have been beneficial to have pointed out to these recipients of the letter that a local scheme also applies.

2. Quality and Volume of Flood Watch/Warning Messages

It has been evident during recent months that the volume of Flood Watch/Warnings messages in respect of river flooding has increased significantly. The warnings are "broad brush" and could benefit from being more focused towards particular areas where the risk is much greater. Repeats of previous messages are not uncommon and has to some extent significantly contributed towards the increased volume and frequency of messages. The sheer volume has the potential to lead to complacency.

It is understood that often much more specific detail is published by the Storm Time Forecasting Service, however, this information is clearly "filtered" by the Environment Agency, resulting in a much broader warning being provided to external agencies, including the Local Authority.

3. Potential for Conflict in Warnings

In the case of sea flooding, much local and very focussed intelligence is gathered and passed to persons living in risk areas by the local Police and Local Authority personnel/Flood Wardens. There is the potential for conflict between the broad AVM message, which is very likely to be less detailed and covering a much wider area. The local warnings provided in respect of sea flooding are very focussed upon individual properties/groups of properties in the risk areas.

You will be aware that a number of the sea defences around Norfolk are not owned or the responsibility of the Environment Agency, particularly in the North Norfolk area where the Holkham Estate, for example, has that responsibility. It is possible that the state of those defences is perhaps better known by the Local Authority/local people and, therefore, judgements will be made about the level of risk that is actually present. If this is then interpreted and passed on to the people in the risk areas who, in many cases are well aware of the risk factor, I am sure you can see that the potential exists for a conflicting AVM message to also be received.

4. General Comments regarding Structure, Content and Presentation of Messages

The Environment Agency national approach to the warning system leaves little room for local interpretation to meet local needs. Whilst we understand the need for detailed information regarding protection of properties etc., to be passed on to the general public, from a Local Authority/Emergency Services viewpoint it would be more helpful to have the greater detail with regard to the particular level of risk that is present in a specific area.

The supporting generic flood preparation information which comes on all flood warnings is less relevant to those "official" personnel who deal with these issues on a day-to-day basis and understand the detail. Therefore, you can appreciate why the above comment is made.

As the messages are primarily transmitted by fax, it would be of assistance if the font used was Arial, font size 12, on all messages, as the current production does degrade significantly as fax messages are passed onto other fax recipients within the cascade system in this County. The standard font used within the County Council is Arial, font size 12, as it is considered it is a much clearer and better defined font.

5. Flood Summaries

We have previously commented regarding the content of river warnings (freshwater) should be more prescriptive, not just "the Yare". I am pleased to note that in many situations now the warnings do indicate the broad length of river, i.e. the River Yare above a certain point, upstream of the A47 Norwich Southern-By-Pass, is shown on the warnings.

6. Exercises/Training

We continue to maintain liaison with the Environment Agency on a fairly regular basis as the new warning system develops. Mike Steen has also contributed to a seminar which was held at the beginning of the flood season last year in North Norfolk to outline the new warning system and how it fits into local plans and this proved to be extremely beneficial.

In Norfolk, we will continue to have exercises to validate the flood warning plans that exist within the County and I believe it is appropriate for the Environment Agency to be involved in all of these and I hope that you will continue to support us in this regard.

In a broader context, it may be appropriate at some point in time for the Environment Agency to consider organising a wider regional exercise to which the various Counties involved could contribute. I make this comment without having discussed it further with my colleagues in the adjoining Counties in this region.

7. All Clear Message

We have highlighted on previous occasions concerns regarding the use of the words "all clear". The definition of "all clear" needs to be clearly understood by members of the community who may be affected by flooding but it does not necessarily mean they can return safely to their previous evacuated homes. The "all clear" effectively means that there are no flood warnings in place for a particular location and I was pleased to see that this

clarification was placed upon the fax messages circulated. We continue to have reservations regarding this wording and in our view it would have been preferable to avoid the use of the "all clear" within the warning system.

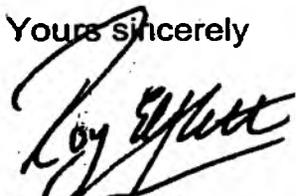
The above is a summary of the general comments which were made at a recent meeting held with all Emergency Planning Officers in the County, and are meant to be constructive and helpful as the system is developed further. It is very clear to me that the freshwater river warning system, whereby the Environment Agency pass messages direct to the County Council and District Councils in Norfolk as opposed to going via the Police is working exceptionally well and that all the warnings are being received and subsequently cascaded to appropriate levels within Norfolk. It is the volume of such messages which causes some concern,

I note that the Environment Agency is currently preparing a report on recent flooding which will subsequently be considered by Government Ministers. As outlined in the opening paragraph of this letter, the comments are more general as opposed to the response to any recent flooding, therefore, that this letter does not have a direct reference to the recent spates of flooding throughout the country.

[REDACTED]

If you wish to discuss this matter with me, please do not hesitate to contact me.

Yours sincerely



Roy Efflett
County Emergency Planning Officer

c.c. Mick Smith, Operational Planning Manager, Norfolk Constabulary
District Emergency Planning Officers - North Norfolk/Broadland, South Norfolk,
King's Lynn & West Norfolk

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