

A STATISTICAL ANALYSIS OF RIVER FLOWS

THE
EASTERN
WATER RESOURCE REGION



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Important

Neither the publishers, The Environmental Research Unit, nor the individual bodies supplying data for this publication will be responsible for any loss or damage arising from the use or interpretation of these data.

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CHAPTER ONE

INTRODUCTION

Uses of River Flow Information

1.1 Information on the magnitude and frequency of occurrence of river flows is required for various evaluations, both economic and environmental, in relation to such things as water abstractions for domestic and industrial use, the formulation of licence conditions for effluent discharge during low flow, the design of bridges and drainage works, and flood prevention and alleviation during flood flows. In order to make these evaluations, flow records covering a considerable length of time must be available. Information is very often required at locations where no gauging has been carried out.

1.2 In the context of water resources management and pollution control, information is needed in different forms for various purposes:

- dry weather flow for abstraction
- 95 percentile flow for effluent disposal
- continuous pattern of flow for fisheries
- instantaneous flow at a particular time
- groundwater flow to assess drought flow

1.3 This publication is designed to provide details of the magnitude and frequency of occurrence of river flows based on records from gauging stations operated by various organisations for diverse purposes. The Office of Public Works operates a large number of gauging stations in connection with arterial drainage and flood alleviation; the E.S.B. operates gauging stations in connection with hydroelectric power generation and Local Authorities operate gauging stations in connection with water supply and pollution control.

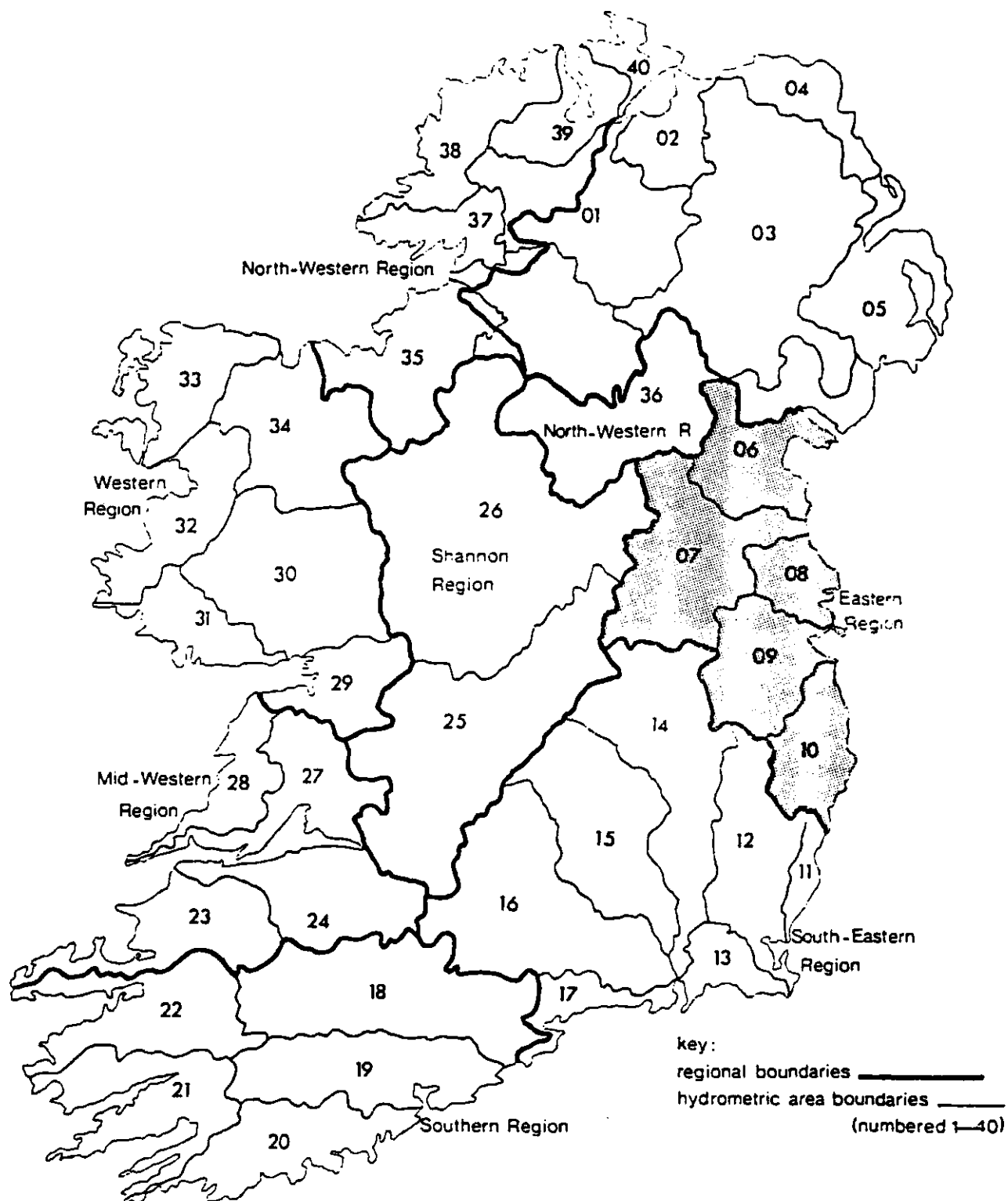


FIG. 1 WATER RESOURCE REGIONS AND HYDROMETRIC AREAS OF IRELAND

1.4 Data on stream flow are obtained by recording the water level at a gauging station on the river and by relating this level to the corresponding rate of flow. The precision of water level measurements and the sensitivity of the site to changes in water level are factors which govern the accuracy and reliability of the data. Since the main uses of this publication will be in connection with water supply and pollution control, the emphasis is on low river flows. (Where the pattern of flow or groundwater flow is important, one should examine the total record for specific years as published in Surface Water Yearbooks). Since 1975, much effort has gone into improving the quality of data at the lower end of the range of river flows in order to produce an accurate estimate of the resource during extreme conditions.

Scope

1.5 This publication covers the Eastern Water Resource Region, specifically hydrometric areas 06 to 10 inclusive (i.e. the catchment areas of all streams entering tidal waters between Murlough Upper, County Louth and Kilmichael Point, Co. Wexford. This region is shown shaded in Figure 1. Data are presented for selected stations for the period of record at the station and, where available, for the calendar year 1981 and for the calendar year 1976. In addition, where sufficient annual values are available, the distribution curves of 7-day sustained low flows are shown plotted on EVI (Extreme Value Type 1 or 'Gumbel') probability paper. Extensive flow measurement surveys were carried out in the Eastern Region during drought/dry years in order to improve the reliability of data analysis and hence the selection of some of these years for detailed study.

1.6 This is the third publication in this series of Statistical Analysis of River Flows Reports. Previous reports covered the South Eastern Water Resource Region (1) and the Southern Water Resource Region (2).

Gauging Stations included in this Publication.

1.7 Details of the gauging stations included in this publication are given in Table 1 below and the distribution of these stations is shown in Figure 2.

TABLE 1
DETAILS OF STATIONS IN THIS PUBLICATION

STATION NO.	LOCATION	RIVER	BDS	National Grid Reference	AREA sq.km
PIEDMONT CATCHMENT					
0630	BALLYGOLY	BIG	LOU	J152100	10.2
BALLYMASCANLAN CATCHMENT					
0631	CURRALHIR	FLURRY	LOU	J083143	45.3
GLYDE AND DEE CATCHMENT					
0613	CHARLEVILLE	DEE	OPW	0044907	307.0
0614	TALLANSTOWN	GLYDE	OPW	N953978	270.0
0621	MANSFIELDSTOWN	GLYDE	OPW	0023952	321.0
0625	BURLEY	DEE	OPW	N925896	176.0
0626	ACLINT	LAGAN	OPW	N893981	144.0
0633	CONEYBURROW BR.	WHITE	LOU	0056893	57.4
BOYNE CATCHMENT					
0701	TREMBLESTOWN	TREMBLESTOWN	OPW	N758574	150.0
0705	TRIM	BOYNE	OPW	N802568	1282.0
0706	FYANSTOWN	MOYNALTY	OPW	N790757	179.0
0709	NAVAN WEIR	BOYNE	OPW	N878667	1610.0
0712	SLANE CASTLE	BOYNE	OPW	N945738	2408.0
0717	ROSEHILL	MOYNALTY	CAV	N720852	74.0
0721	DRUMREE	SKANE	MEA	N943517	3.9
0724	CLONYMEATH	CLONYMEATH	MEA	N856490	16.9

LOU = LOUTH COUNTY COUNCIL
CAV = CAVAN COUNTY COUNCIL
DUC = DUBLIN COUNTY COUNCIL

OPW = OFFICE OF PUBLIC WORKS
MEA = MEATH COUNTY COUNCIL
ESB = ELECTRICITY SUPPLY BOARD

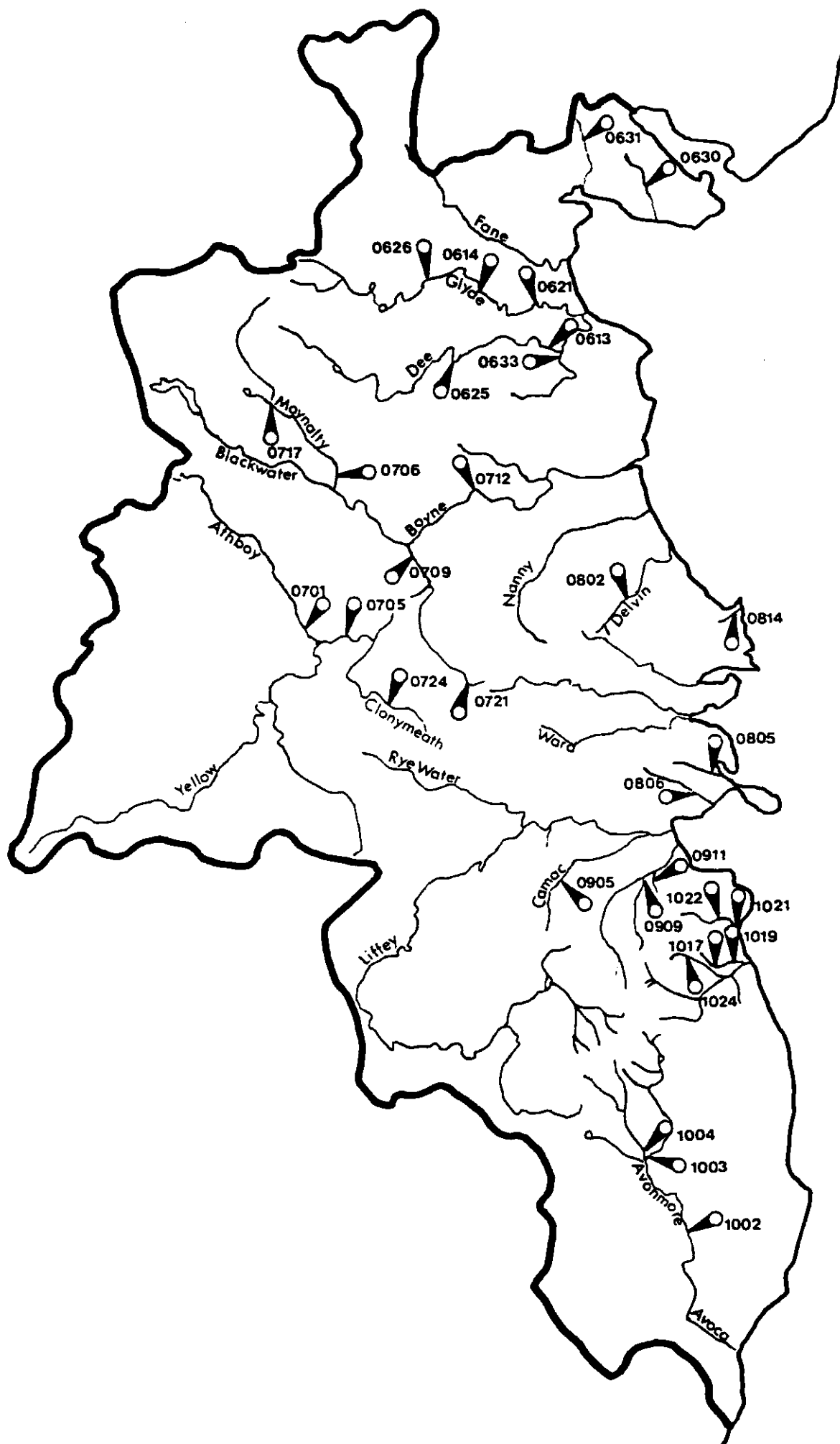


FIG. 2 DISTRIBUTION OF SELECTED GAUGING STATIONS

TABLE 1 (Cont'd.)

STATION NO.	LOCATION	RIVER	BDS	National Grid Reference	AREA sq.km
<u>DELVIN CATCHMENT</u>					
0802	NAUL	DELVIN	DUC	0132612	37.0
<u>SLUICE CATCHMENT</u>					
0805	KINSALEY HALL	SLUICE	DUC	0220417	10.1
<u>COASTAL CATCHMENTS</u>					
0806	HOLE IN THE WALL	MAYNE	DUC	0222415	15.9
0814	SKERRIES	MILL	DUC	0256601	11.7
<u>LIFFEY CATCHMENT</u>					
0905	CLONDALKIN	CAMMOCK	DUC	0093321	51.7
<u>DODDER CATCHMENT</u>					
0909	WILLBROOK ROAD	OWENDOHER	DUC	0142287	22.4
0911	FRANKFORT	SLANG	DUC	0168287	6.5
<u>SHANGANAGH CATCHMENT</u>					
1021	COMMON'S ROAD	SHANGANAGH	DUC	0252230	30.9
1022	CARRICKMINES	CABINTEELY	DUC	0234242	10.4
<u>DARGLE CATCHMENT</u>					
1017	BALLYMAN	BALLYMAN	DUC	0227187	3.8
1019	VALLOMBROSA	BALLYMAN	DUC	0246183	5.7
1024	GLENCULLEN	GLENCULLEN	DUC	0192194	13.8
<u>AVOCA CATCHMENT</u>					
1002	RATHDRUM	AVONMORE	ESB	T197883	233.0
1003	LARAGH	AVONMORE	ESB	T146965	107.0
1004	LARAGH	GLENMACNASS	ESB	T143965	28.0

CHAPTER TWO

MEASURES OF LOW FLOW

2.1 DEFINITION OF TERMS

Daily Mean Flow	The mean of instantaneous discharges throughout a 24-hour period.
Surface Runoff	Surface Runoff is that water which travels on or near the ground surface to a channel and which does not contribute to baseflow.
Baseflow	Baseflow is the contribution to stream flow from groundwater.
Dry Weather Flow	The annual minimum daily mean flow with a probability of exceedance of 0.98 (i.e. with a return period of 50 years).
95-Percentile Flow	<p>The daily mean flow which is equalled or exceeded 95 per cent of the time.</p> <p>Note: It is not the average of the 95 percentile flow in each calendar year.</p>
N-Day Sustained Low Flow Rate	The lowest daily mean flow rate which is not exceeded for N consecutive days in a given year.

The 7-day sustained low flow rate with a 15 year return period is computed from the series of annual values of these statistics.

Low Flow

2.2 River flow is comprised of a) surface runoff from precipitation and b) baseflow derived from groundwater storage. During a period of drought, when river flows decrease, the proportion of flow arising from runoff decreases. In the absence of rainfall the magnitude of the baseflow component also continues to decrease with time but at a diminishing rate. At the end of a long period of drought the river flow may be attributed totally to baseflow with no effective contribution from runoff. Depending upon the length of the drought period and the antecedent aquifer condition a range of low flow rates may be experienced.

Minimum Flow:

2.3 A low flow condition which is clearly of importance is the lowest flow ever experienced. This condition is not easily defined but in the Eastern Water Resource Region must be very similar to that experienced immediately before the end of the drought in 1976. The minimum flow is therefore an unusual event. The Dry Weather Flow is defined as the annual minimum daily mean flow rate with a return period of 50 years.

Ninety-five Percentile Flow:

2.4 Where pollution control is concerned, interest is more often centred on low flows more common than the dry weather flow. The practice in relation to effluent discharges is to use the flow which is equalled or exceeded at least 95% of the time(3). This measure of flow is sensitive to the length of record. It is considered, however, that with 10 or 12 years of record results are fairly stable. Unfortunately, many flow records are currently of less than 10 years duration.

Sustained Low Flows:

2.5 Another measure of low flow is the 7-day sustained low flow, the lowest flow which is not exceeded for 7 consecutive days in any year. It is sometimes considered in place of the 95 percentile flow. At the end of a long period of drought the daily variation in the rate of river flow is so small that 7-day Sustained Low Flow values tend, in dry years, to merge with the minimum flow values. It is not practicable to measure and record these very small variations with precision and thus to separate the minimum flow value from the 7-day Sustained Low Flow value.

2.6 The 7-day sustained low flow values are computed from the sequence of daily mean flows. For each year the series of overlapping 7-day periods is inspected and the maximum daily mean flow value occurring during each period is determined. The 7-day period with the minimum of such upper limits constitutes the driest week in the year while the maximum flow during this week constitutes the 7-day sustained low flow value for the year in question.

2.7 In this publication an extreme value distribution, specifically the extreme value Type 1 distribution (EVI) has been fitted to annual 7-day sustained low flow values by the method of maximum likelihood. The relationship between the reduced variate y of the EVI distribution and the 7-day sustained low flow rates of specific return periods is expressed algebraically as given below. The advantage of fitting such a distribution is that flow may be expressed as a linear function of the reduced variate y thus permitting a more simplified analysis to be carried out.

2.8 In plots of these distributions shown later, the annual 7-day sustained low flow rates are expressed in terms of their mean. There is one scale for ordinates - values of 7-day sustained low flow - and two scales for abscissae - one for probability of exceedance (P) and one for return period in years (T). On the ordinate scale, the annual values of the 7-day sustained low flows are shown as multiples of the mean annual Sustained Low Flow value.

T and P are related by:

$$P = (T - 1)/T \dots\dots (1)$$

or $T = 1/(1-P) \dots\dots (2)$

The EVI (Gumbel) distribution is specified as follows:-

Let x = flow rate

then y (reduced variate) = $(x - U)/a \dots\dots (3)$

where U is a location parameter, and

a is a scale parameter

from (3) $x = U + ay$

$$P \text{ (Prob. of exceedance) } = \exp(-\exp(-y)) \dots\dots (4)$$

or $y = -\ln(-\ln(P)) \dots\dots (5)$

from (1) and (5)

$$y = -\ln(-\ln((T - 1)/T))$$

(The shape of the fitted EVI distribution depends upon the skewness of the sample data).

CHAPTER 3

ANALYSIS OF DATA

Low Flow Analysis

3.1 The following pages contain a short analysis of low flow data. It comprises comparisons of the various measures of low flow, their magnitude and probability of occurrence. The effect of using different lengths of record was also examined.

Minimum Flow

3.2 A selection of gauging stations with records of varying lengths was used to assess the return period of the lowest flow recorded which, in general, occurred in 1975 or 1976. These stations are listed in Table 2. Three of the Stations listed have record lengths of 24 years (0706 Fyanstown), 26 years (0621 Mansfieldstown) and 36 years (1003 Laragh). The remainder have record lengths ranging from 6 to 13 record years.

3.3 The records at the three stations with long periods of record were analysed using the full period of record and the period of record from 1972 onwards. Both periods included the drought years 1975/76.

3.4 At the three stations at which long term records are available the return period of the lowest daily mean flow ranges from 36 years to 65 years. When the analysis of records from these stations is restricted to the period from 1972 onwards, the return period of the lowest daily mean flow ranges from 13 to approximately 19 years. The return periods obtained when the analysis is confined to the Post 1972 data at these three stations is of the same order as that computed for the other stations contained in Table 3 and for which only a short period of record is available. This similarity leads to the inference that the lowest recorded daily mean flow in the period from 1972 onwards has a return period of about 50 years regionwide or equivalently, can be used as an estimator of the dry weather flow defined thus.

TABLE 2

Stations Included in the Analysis of the Relationship between the 95-Percentile Flow and the Dry Weather Flow.

STATION NO.	LOCATION	RIVER	AREA Sq. km
<u>PIEDMONT CATCHMENT</u>			
0630	BALLYGOLY	BIG	10.2
<u>BALLYMASCANLAN</u>			
0631	CURRALHIR	FLURRY	45.3
<u>GLYDE AND DEE CATCHMENT</u>			
0613	CHARLEVILLE	DEE	307.0
0614	TALLANSTOWN	GLYDE	270.0
0621	MANSFIELDSTOWN	GLYDE	321.0
0625	BURLEY	DEE	176.0
0626	ACLINT	LAGAN	144.0
<u>BOYNE CATCHMENT</u>			
0701	TREMBLESTOWN	TREMBLESTOWN	150.0
0705	TRIM	BOYNE	1282.0
0706	FYANSTOWN	MOYNALTY	179.0
<u>AVOCA CATCHMENT</u>			
1003	LARAGH	AVONMORE	107.0
1004	LARAGH	GLENMACNASS	28.0

Ninety Five Percentile Flow and 7-Day Sustained Low Flow

3.5 The relationship between the lowest daily mean flow rate in the period of record (assumed to be equal to the dry weather flow rate) and

(a) the 95-percentile flow rate in the period of record, and

(b) the 7-day Sustained Low Flow with a return period of 15 years*

were examined and the results are shown in Table 3. The 95 percentile flowrate and the 7-day Sustained Low Flow with a 15 year return period are shown as multiples of the estimated dry weather flowrate.

3.6 It can be seen from Table 3 that

(a) the 95 percentile flowrate varies from 1.5 to 4.0 times the DWF and that

(b) the 7-day Sustained Low Flow varies from 1.0 to 1.3 times the DWF.

3.7 The 95 percentile flowrate at the three stations at which long term data is available, Stations 0621 Mansfieldstown, 0706 Fyans town and 1003 Laragh was found to be a multiple of 2.3, 3.2 and 2.8 times the dry weather flowrate, respectively. The latter two values of 3.2 and 2.8 would be considered to be high in comparison with the results found in the South Eastern Water Resource Region (1) and the Southern Water Resource Region (2) where the multiple was generally about 2.

3.8 Accordingly, taking the 95 percentile flowrate at about twice the dry weather flowrate is a conservative estimate of the 95 percentile flowrate. In addition, in some catchments, where rivers go practically dry on occasion, the relationship between the dry weather flow and the 95 percentile flowrate can be meaningless.

* The 7-day Sustained Low Flow with a return period of 15 years has been estimated by interpolation in the EVI plot of annual 7-day Sustained Low Flow values. The return periods of specific 7-day Sustained Low Flow rates can be estimated from the EVI plots presented later.

Table 3

Table of (a) 95-Percentile Flow Values and (b) 7-Day Sustained Low Flows with Return Periods of 15 Years

Expressed as a Multiple of the Dry Weather Flow Rate

Station No.	Location	River	Area	Period of Record	Years of Record Used	Min. DMF in Period DWF	Return Period	95%tile Flow	7-Day SLF with 15 Year Return Period
			sq. km			M ³ /s	Years	Expressed as a Multiple of the DWF	
<u>Piedmont Catchment</u>									
0630	Ballygoly	Big	10	75-87	13	0.01	19.0	2.1	1.1
<u>Ballymascanlan Catchment</u>									
0631	Curralhir	Flurry	45	75-87	13	0.03	19.0	2.3	1.1
<u>Glyde and Dee Catchment</u>									
0613	Charleville	Dee	307	76-87	12	0.19	18.9	2.5	1.3
0614	Tallanstown	Glyde	270	76-87	11	0.20	16.1	2.2	1.2
0621	Mansfieldstown	Glyde	321	55-80	26	0.25	40.0	2.3	1.1*
0625	Burley	Dee	176	72-77	6	0.12	7.8	1.5	1.1
0626	Aclint	Lagan	144	72-80	9	0.09	13.3	2.3	1.1
<u>Boyne Catchment</u>									
0701	Tremblestown	Tremblestown	150	75-81	7	0.1	10.4	4.0	1.2
0705	Trim	Boyne	1282	75-81	7	1.73	10.4	1.74	1.0
0706	Fyanstown	Moynalty	179	57-80	24	0.09	36.5	3.2	1.1*
<u>Avoca Catchment</u>									
1003	Laragh	Avonmore	107	46-84	36	0.17	65.4	2.8	1.3*
1004	Laragh	Glenmacnass	28	75-84	10	0.07	14.7	2.1	1.3

* Note: The sustained low flow values for Stations 0621 Mansfieldstown, 0706 Fyanstown and 1003 Laragh have been estimated from data for the period 1972 to end of the processed record to allow comparability with short-record data.

Relationship of Return Period to Length of Record

3.9 Figure 3 shows plots of the distribution of 7-day sustained low flows for 3 stations. These are Stations No.'s 0621 Mansfieldstown (River Glyde), 0706 Fyans town (River Moynalty) and 1003 Laragh (Avonmore River). These were analysed to show how length of record affects the magnitude of the 7-day sustained low flow with a fifteen year return period. Each plot in Figure 3 contains 2 lines, one based on data for the full period of record at each station and the other on the available processed data post 1972. The flow values are shown as proportions of the mean of say 9 (in the case of 1972-1980) or say 24 (in the case of a record of 24 years) annual values.

3.10 The plotting positions were obtained from Volume 1 of the Flood Studies Report, NERC (4), and may be estimated by Gringorten (5). Differences between the means of the short term and the longer term series have the effect of separating the points vertically. Horizontal separation of the plotted points is caused by differences in the length of record as rarer low flow events are plotted further to the right. A scale for the expected return period (in years) of the flows plotted here is shown along the upper border of the plot.

3.11 An examination of Figures 3A, 3B and 3C shows that the value of the 7-day sustained low flows with a 15 year return period based on short term data, which includes data for 1975/76, is very similar to that obtained from the longer period of record.

3.12 The effect of having different lengths of record on the shape of the distribution curve and on the estimated return period of the lowest value may be seen from the plots in Figure 3. As the period of record increases, irregularities in the plot tend to be smoothed out. The estimated return period of the lowest 7-day sustained low flow depends upon the length of record and, for example, at Station 1003 Laragh increases from approximately 19 years with 13 years of record to 65 years with 36 years of record.

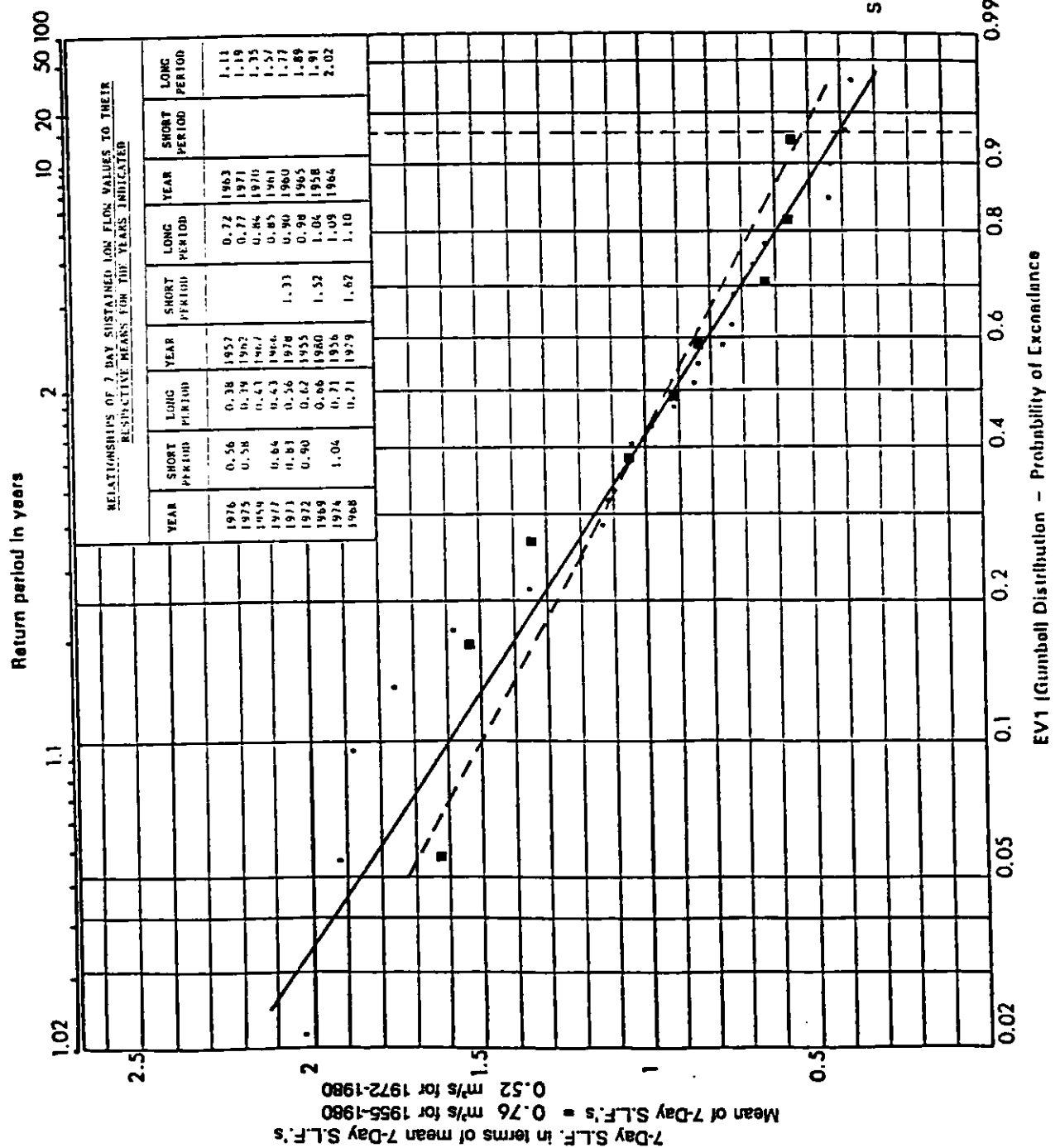


FIG 3A Comparison of short and long-term plots of 7 day sustained low flows.

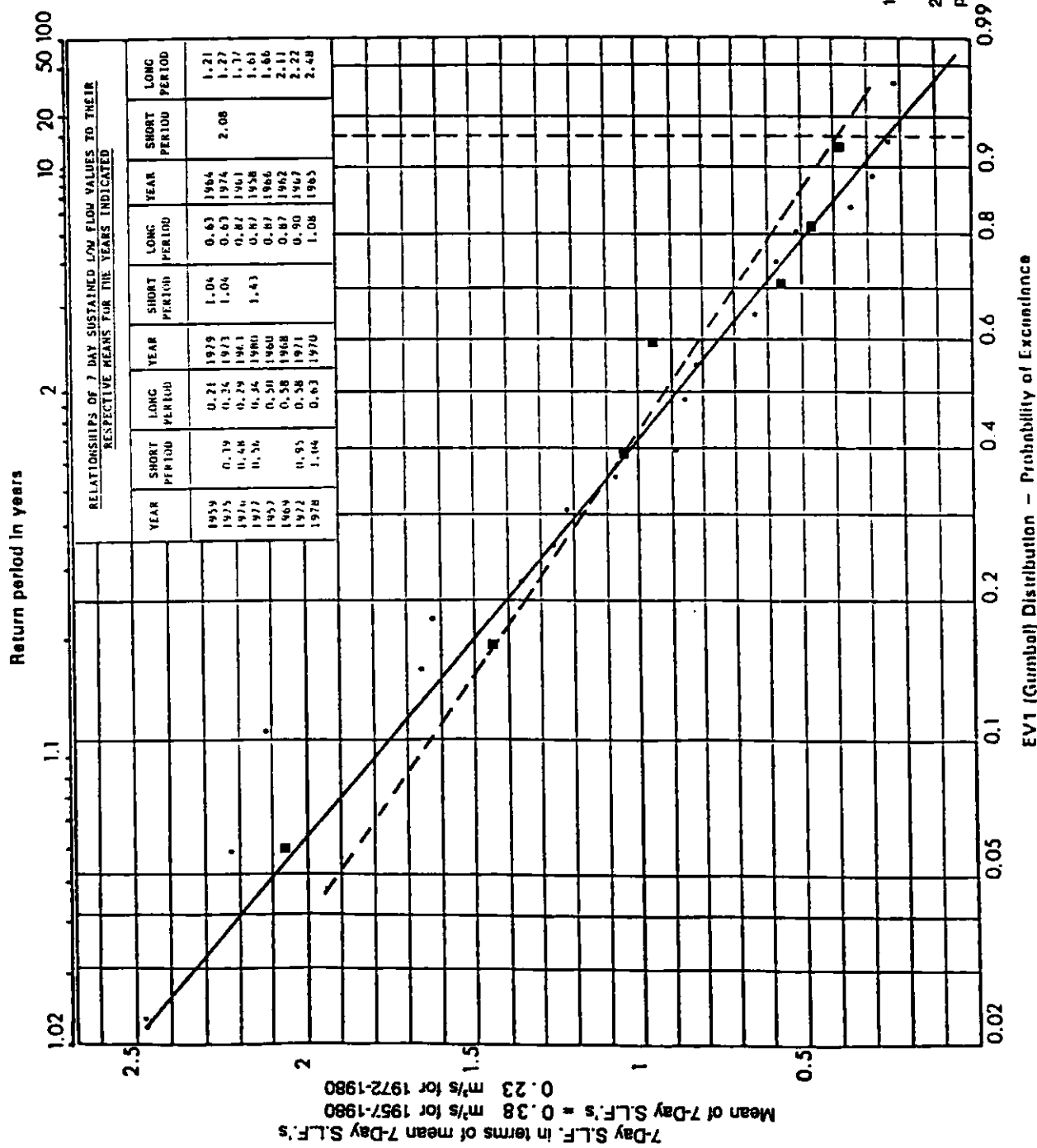


FIG 3B Comparison of short and long-term plots of 7 day sustained low flows.

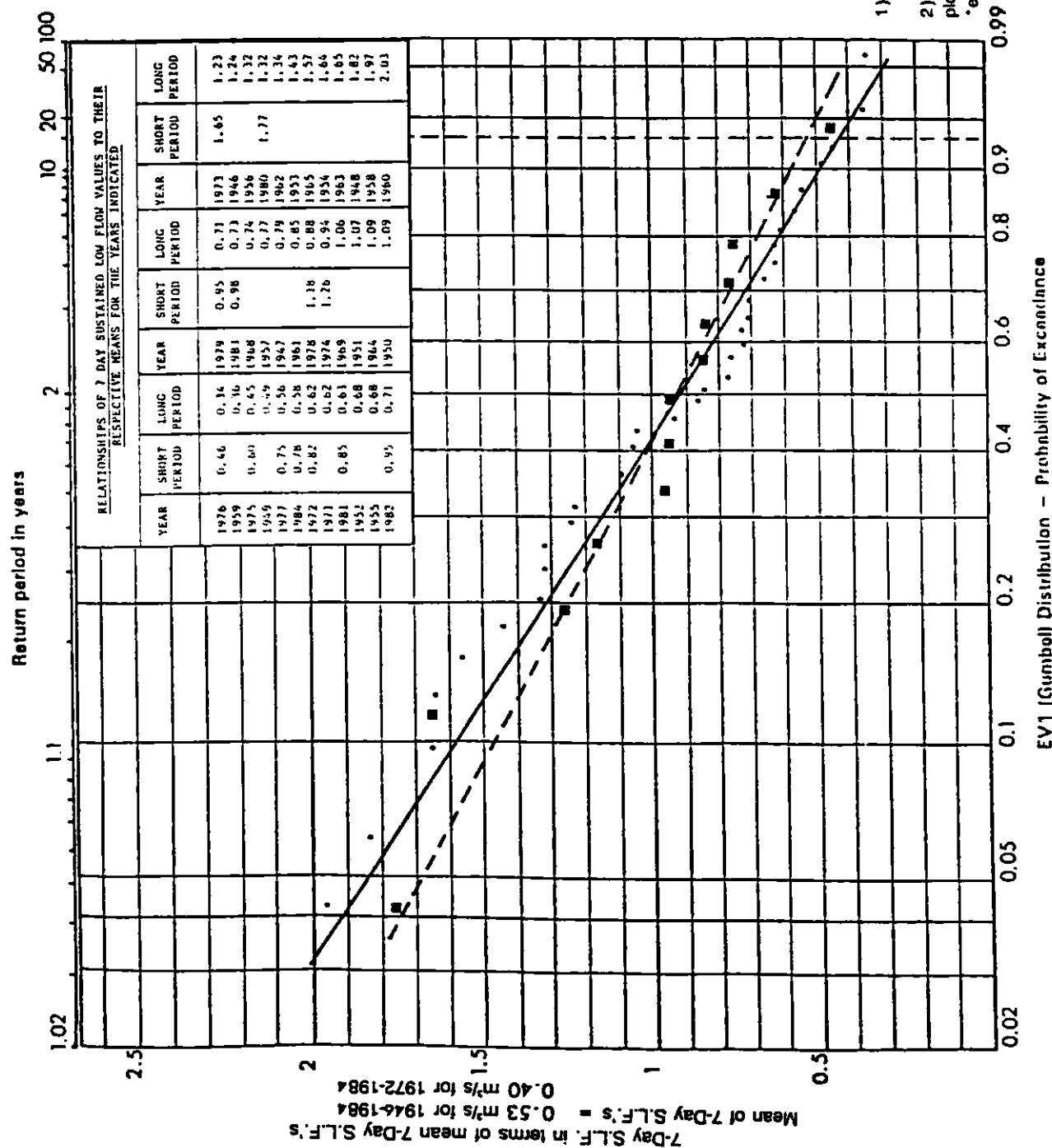


FIG 3C Comparison of short and long-term plots of 7 day sustained low flows.

Duration of Low Flow

3.13 For the three stations for which long periods of processed records are available, an examination was undertaken as to the duration of low flows in dry years. The years examined were 1949, 1952, 1955, 1957, 1959, 1969, 1972, 1973, 1975, 1976, 1977, 1978, 1981, 1983 and 1984, where data was available, at Stations 0621 Mansfieldstown, 0706 Fyanstown and 1003 Laragh and the results are shown in Table 4A, 4B and 4C.

3.14 In assessing these tables it should be noted that the 95 percentile flowrate over the full period of record was $0.58 \text{ m}^3/\text{s}$ at Station 0621 Mansfieldstown, $0.27 \text{ m}^3/\text{s}$ at Station 0706 Fyanstown and $0.47 \text{ m}^3/\text{s}$ at Station 1003 Laragh.

3.15 It can be seen from Tables 4A, 4B and 4C that the lowest daily mean flow, the 7-day sustained low flow and the 15-day sustained low flow are all of the same order of magnitude in drought/dry years.

Table 4A

Comparison of the lowest Daily Mean Flow, the 7-day Sustained Low Flow and the 15-day Sustained Low Flow of selected Individual years for Station 0621 Mansfieldstown

Year	Lowest Daily Mean Flow	7 day Sustained Low Flow	15 day Sustained Low Flow
	m^3/s	m^3/s	m^3/s
1957	0.40	0.55	0.73
1959	0.25	0.33	0.39
1969	0.42	0.50	0.51
1972	0.44	0.47	0.52
1973	0.33	0.43	0.54
1975	0.27	0.30	0.31
1976	0.27	0.29	0.31
1977	0.31	0.33	0.35
1978	0.62	0.69	0.78

Table 4B

Comparison of the lowest Daily Mean Flow, the 7-day Sustained Low Flow and the 15-day Sustained Low Flow of selected Individual years for Station 0706 Fyanstown

Year	Lowest Daily Mean Flow	7 day Sustained Low Flow	15 day Sustained Low Flow Year
	m ³ /s	m ³ /s	m ³ /s
1957	0.17	0.19	0.21
1959	0.08	0.08	0.08
1969	0.18	0.22	0.25
1972	0.19	0.22	0.28
1973	0.18	0.24	0.33
1975	0.09	0.09	0.14
1976	0.09	0.11	0.13
1977	0.12	0.13	0.17
1978	0.20	0.24	0.34

Table 4C

Comparison of the lowest Daily Mean Flow, the 7-day Sustained Low Flow and the 15-day Sustained Low Flow of selected Individual years for Station 1003 Laragh

Year	Lowest Daily Mean Flow	7 day Sustained Low Flow	15 day Sustained Low Flow
	m ³ /s	m ³ /s	m ³ /s
1949	0.25	0.26	0.27
1952	0.30	0.36	0.52
1955	0.28	0.36	0.4
1957	0.32	0.41	0.56
1959	0.17	0.19	0.23
1969	0.48	0.56	0.68
1972	0.31	0.33	0.36
1973	0.54	0.66	0.95
1975	0.22	0.24	0.29
1976	0.17	0.18	0.23
1977	0.27	0.30	0.4
1978	0.4	0.47	0.6
1981	0.32	0.34	0.47
1983	0.32	0.39	0.46
1984	0.25	0.31	0.48

CHAPTER FOUR

PRESENTATION OF DATA

Introduction

- 4.1 Data on low flow in the Eastern Region are presented in station number order. In particular, data are provided on:
- a) mean rainfall,
 - b) mean flow rates,
 - c) extreme flow rates,
 - d) tables of exceedance percentiles (from which 95% flow rates may be abstracted),
 - e) flow-duration curves, and
 - f) sustained low flow values.

These data are presented to provide users of river flow data having differing requirements with a source of information suited to their particular needs. The data is presented with four A4 sheets per station, labelled Sheet A, B, C and D. Details of the format of each sheet are given hereunder.

Content of Data Sheets

- 4.2 In the following:

Mean flow rates are the average of the daily mean flow values over the stated period of record;

The lowest and highest recorded daily mean flow in the stated period of record; (in some cases lower flows have been gauged and where applicable these are also shown);

The tables of exceedance percentiles show the daily mean flow rate which was equalled or exceeded for the given percentage of days in the stated period;

Flow-duration curves are log-normal plots of exceedance percentiles;

Distribution plots of 7-day sustained low flows are log-EV1 plots of the exceedance probabilities of 7-day sustained low flows for a stated period.

Format of Data Sheets

4.3 The following data are presented for each station:

SHEET A - DATA FOR A STATED PERIOD OF RECORD

1. Station Number.
2. Station and river names.
3. Body Responsible
4. National Grid Reference of station.
5. Catchment area (km^2) to station.
6. Long average rainfall 1941-1970 (mm/yr) based on isohyetal contour maps prepared by the Meteorological Service.
7. Stated period of record (calendar years).
8. Mean flow rate (m^3/s and equivalent in mm rain/yr) for the stated period of record.
9. Minimum and maximum daily mean flow rates (m^3/s) and the dates of occurrence.
10. Table of exceedance percentiles showing the daily mean flow rates equalled or exceeded for the given percentage of days in the stated period.

11. Flow-Duration Curve for the stated period of record based on the table of exceedance percentiles.
SHEET B - DATA FOR 1981 (where available)
12. Table of 3-, 7-, 15- and 30-day sustained low flows for the calendar year 1981.
13. Table of the average of annual values of 3-, 7-, 15- and 30-day sustained low flows for the stated period of record.
14. Table of exceedance percentiles showing the daily mean flow rates equalled or exceeded for the given percentage of days in the calendar year 1981.
15. Flow Duration Curves for the stated period of record and for the calendar year 1981 based on the tables of exceedance percentiles.

SHEET C - DATA FOR 1976 (where available)

Where information for the calendar year 1976 is available, the following data are included:-

16. Table of 3-, 7-, 15- and 30- day sustained low flows for the calendar year 1976.
17. Table of minima of annual values of 3-, 7-, 15- and 30-day sustained low flows for the stated period of record.
18. Table of exceedance percentiles showing the daily mean flow rates equalled or exceeded for the given percentage of days in the calendar year 1976.
19. Flow-Duration Curves for the stated period of record and for the calendar year 1976.

SHEET D - DISTRIBUTION OF 7-DAY SUSTAINED LOW FLOWS

The fourth page contains a plot of the annual values of 7-day sustained low flows for a stated period of record on EVI (Gumbel) paper.

In this plot sustained low flows are expressed in terms of the mean of the annual sustained low flow values. In the ordinate scale, the annual values of the 7-day Sustained Low Flows are shown as multiples of the mean annual Sustained Low Flow value. For the abscissa there are two scales, one showing probability of exceedance (P) and one for return period in years (T).

STATION DATA

STATION NO 0613

Sheet B

Dee at Charleville

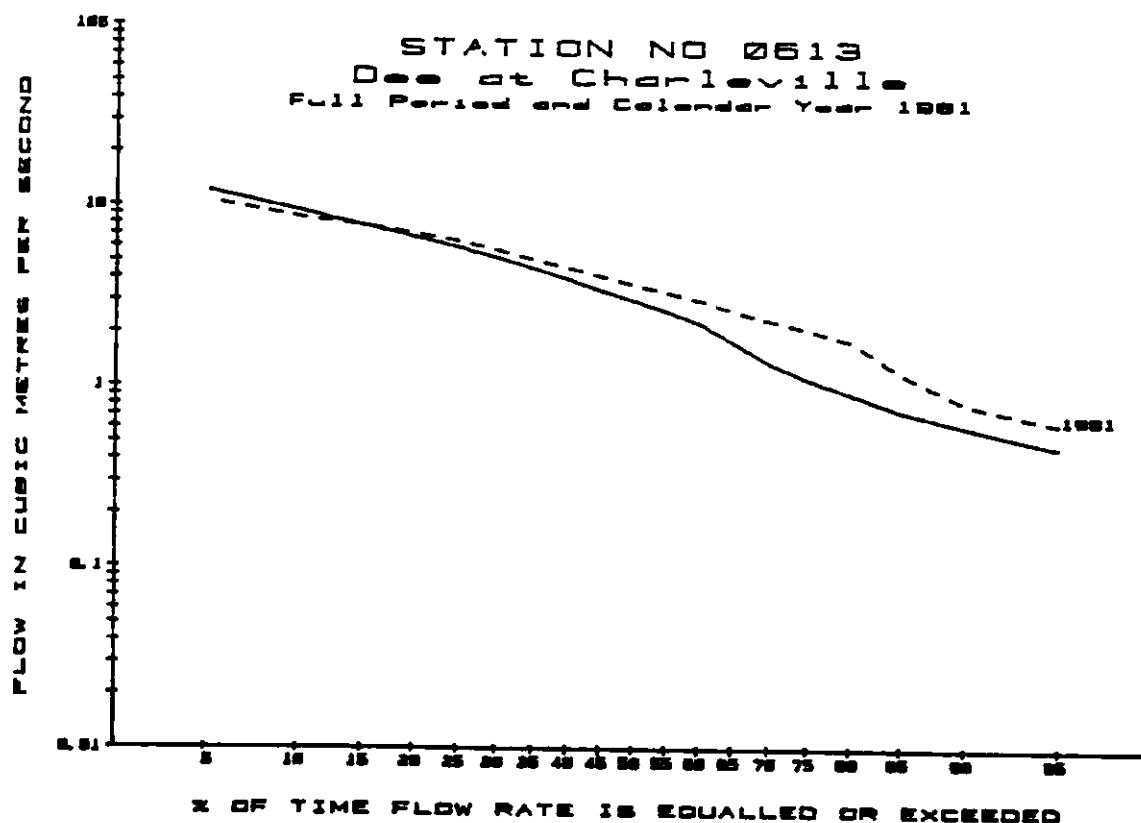
Data based on continuous water level records for the period :
1-Jan-76 to 31-Dec-87

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	0.491	0.529	0.67	0.70	
1976-1987	0.499	0.547	0.63	0.81	[Average]

TABLE OF EXCEEDANCE PERCENTILES

Year 1981 Only					
5%	10.68	30%	5.75	75%	2.12
10%	8.66	40%	4.61	80%	1.82
15%	7.87	50%	3.73	85%	1.21
20%	7.12	60%	3.06	90%	0.83
25%	6.44	70%	2.38	95%	0.64

** All flow rates above are in cubic metres per second. **



STATION NO 0613

Sheet C

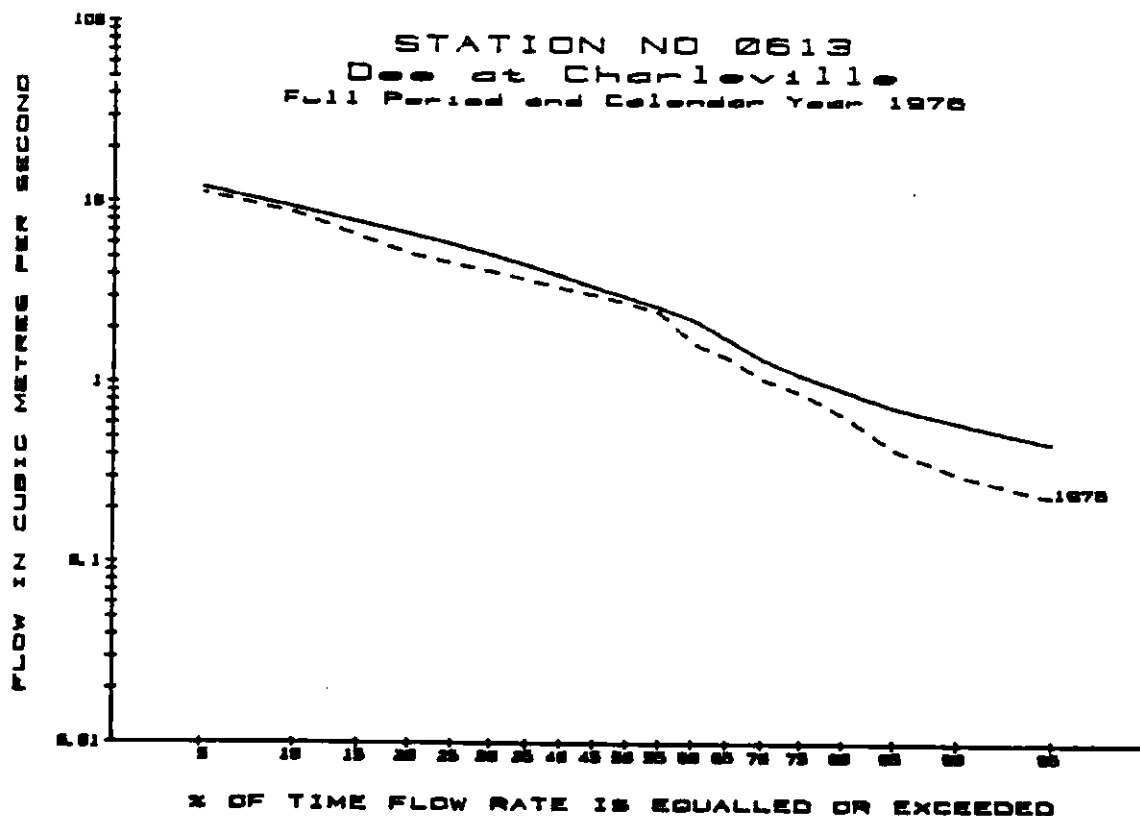
Dee at Charleville

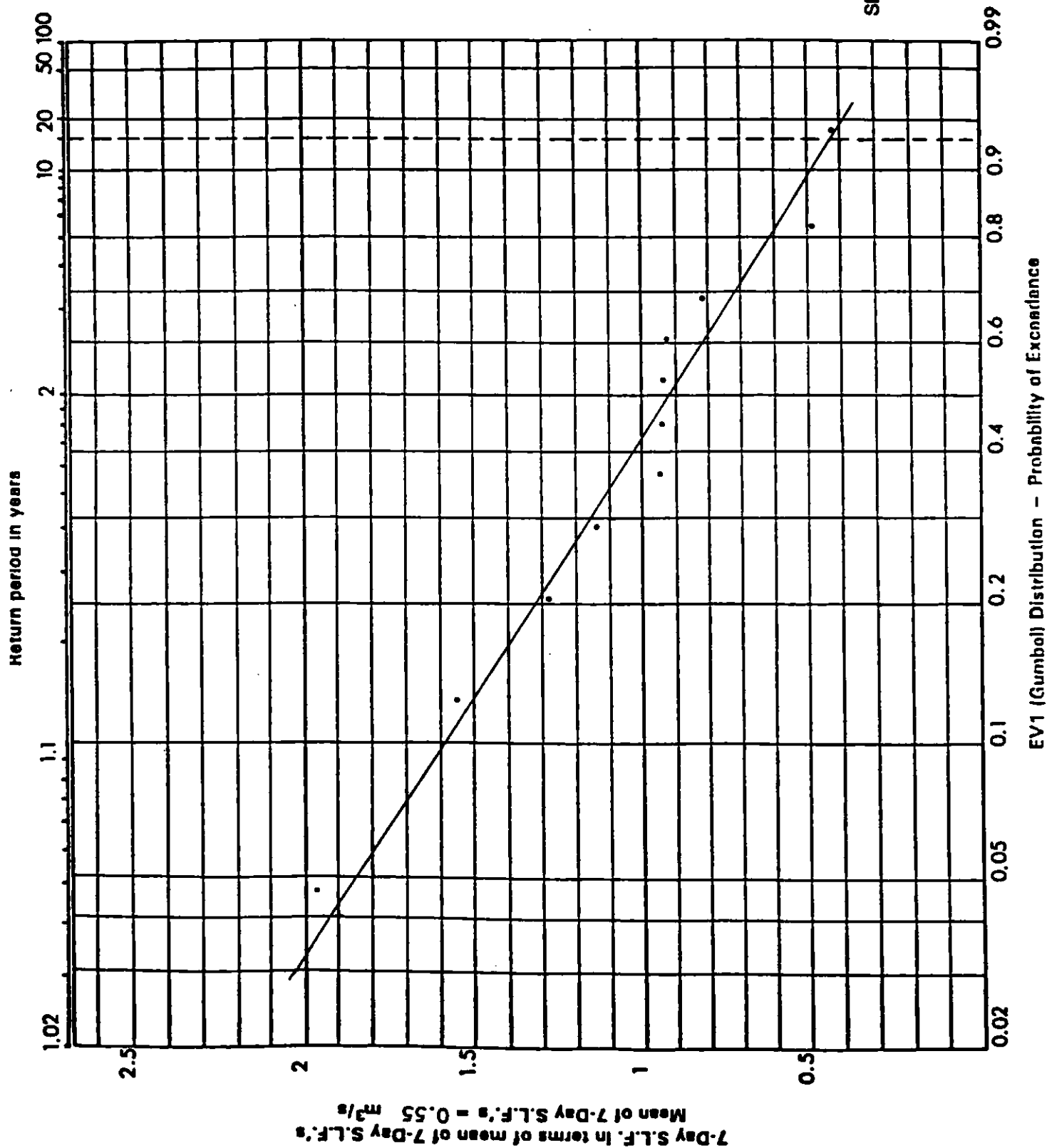
Data based on continuous water level records for the period :
1-Jan-76 to 31-Dec-87

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1976	0.213	0.231	0.24	0.26	
1976-1987	0.189	0.213	0.24	0.26	[Min]

TABLE OF EXCEEDANCE PERCENTILES					
Year 1976 Only					
5%	11.33	30%	4.22	75%	0.90
10%	8.76	40%	3.42	80%	0.68
15%	6.58	50%	2.83	85%	0.44
20%	5.25	60%	1.69	90%	0.32
25%	4.65	70%	1.07	95%	0.24

** All flow rates above are in cubic metres per second. **





Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0613
R. DEE AT CHARLEVILLE
for period 1976 to 1987

STATION NO 0614

Sheet A

Glyde at Tallanstown

Body Responsible: OPW

N.G.R.: N 953 978

Catchment Area to Station: 270.0 sq km
 Long Average Rainfall [1941-1970]: 943 mm/yr

Data based on continuous water level records for the period :
 1-Jan-76 to 31-Dec-87 *

Mean Flow Rate: 4.29 [501 mm/yr rainfall on catchment]

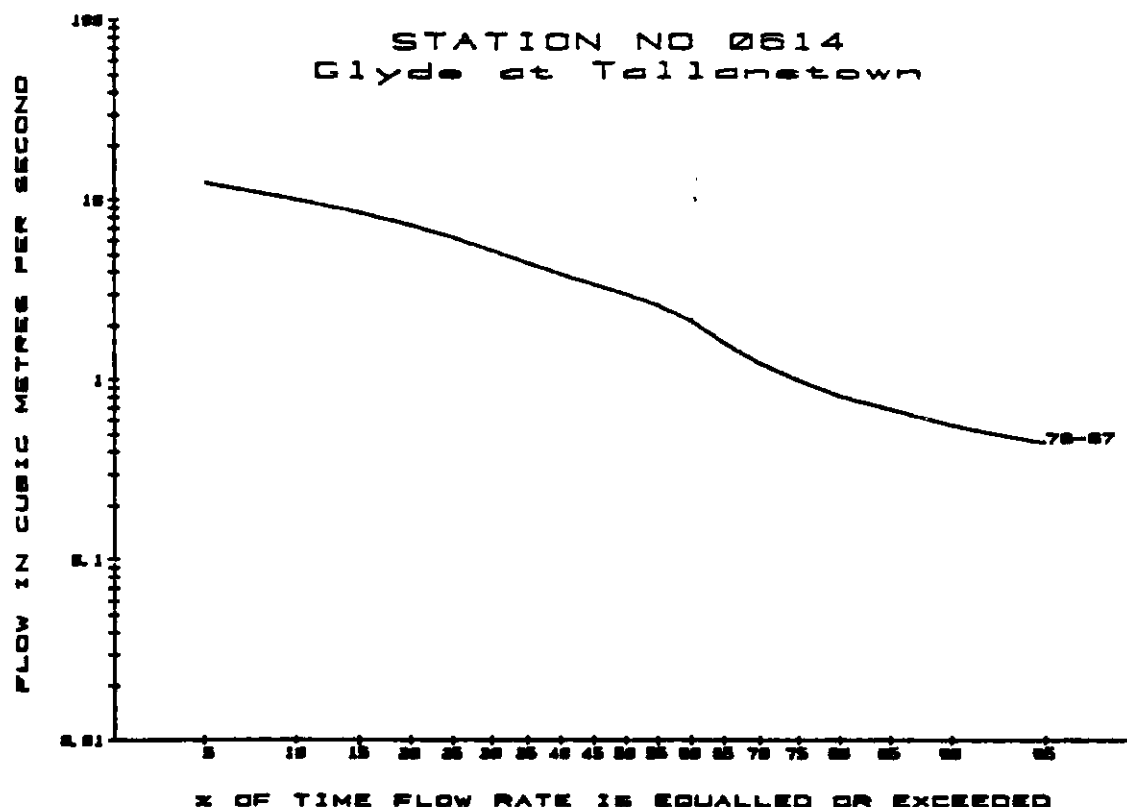
Daily Mean Flows: minimum 0.200 on 8-Sep-76
 maximum 34.80 on 30-Dec-78

TABLE OF EXCEEDANCE PERCENTILES

TABLE 2		Full period		PERCENTILES	
5%	12.57	30%	5.27	75%	1.00
10%	10.06	40%	3.90	80%	0.82
15%	8.55	50%	3.01	85%	0.70
20%	7.27	60%	2.15	90%	0.57
25%	6.22	70%	1.25	95%	0.45

** All flow rates above are in cubic metres per second. **

* excl. data for 1985



STATION NO 0614

Sheet B

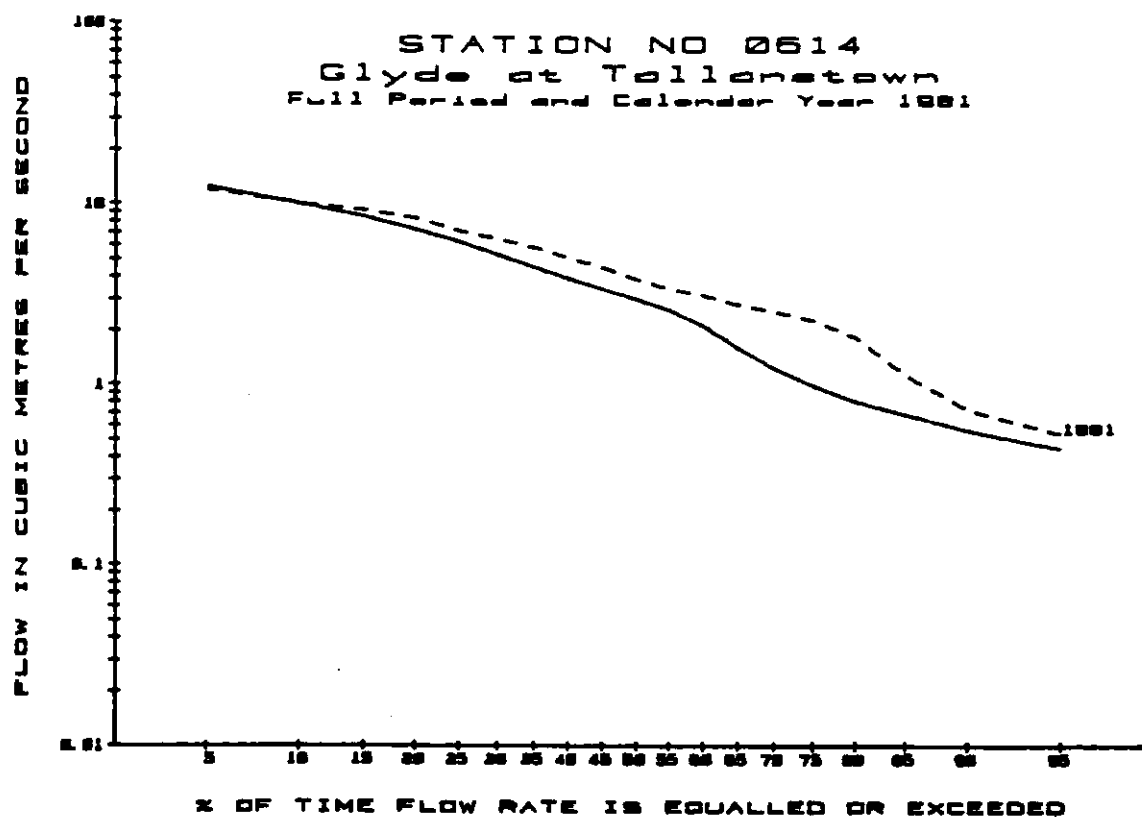
Glyde at Tallanstown

Data based on continuous water level records for the period :
1-Jan-76 to 31-Dec-87 *

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	0.403	0.459	0.57	0.69	
1976-1987	0.430	0.480	0.54	0.67	[Average]

TABLE OF EXCEEDANCE PERCENTILES					
Year 1981 Only					
5%	12.04	30%	6.46	75%	2.30
10%	10.13	40%	5.09	80%	1.86
15%	9.29	50%	3.86	85%	1.15
20%	8.39	60%	3.16	90%	0.74
25%	7.14	70%	2.57	95%	0.54

** All flow rates above are in cubic metres per second. **
* excl. data for 1985



STATION NO 0614

Sheet C

Glyde at Tallanstown

Data based on continuous water level records for the period :
1-Jan-76 to 31-Dec-87*

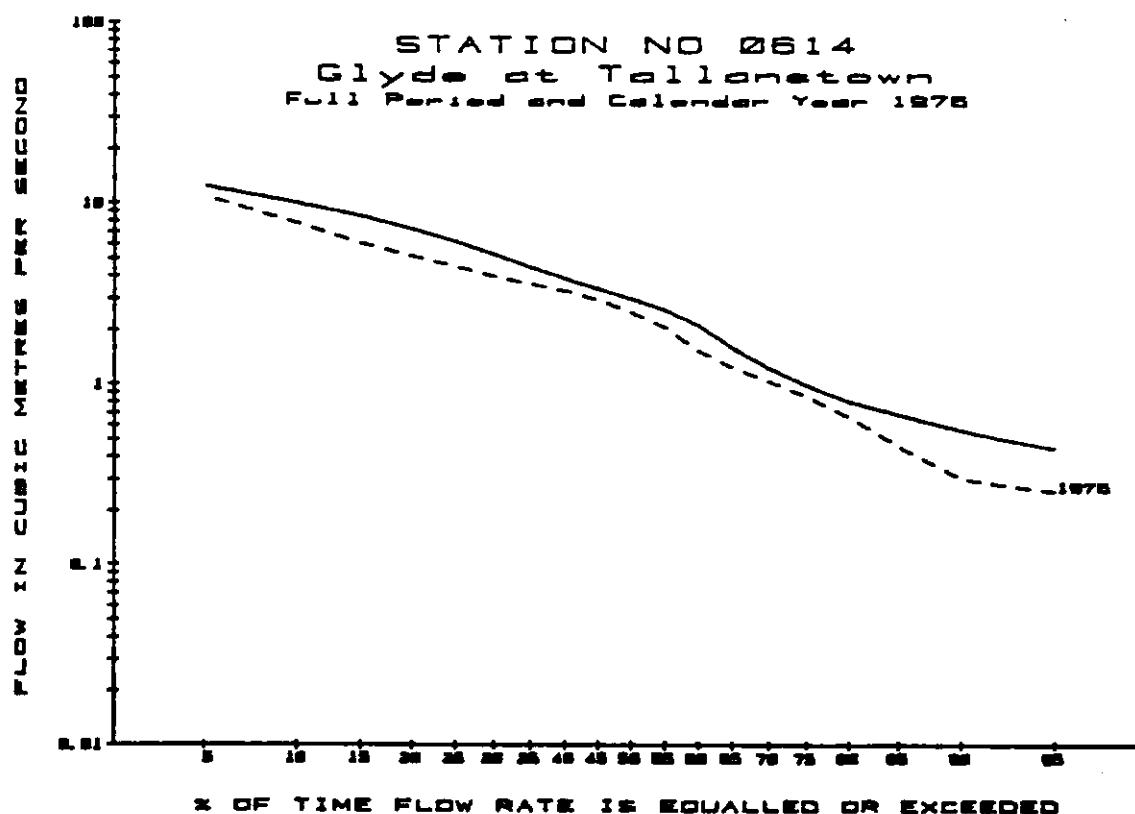
PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1976	0.209	0.222	0.27	0.29	
1976-1987	0.209	0.222	0.27	0.29	[Min]

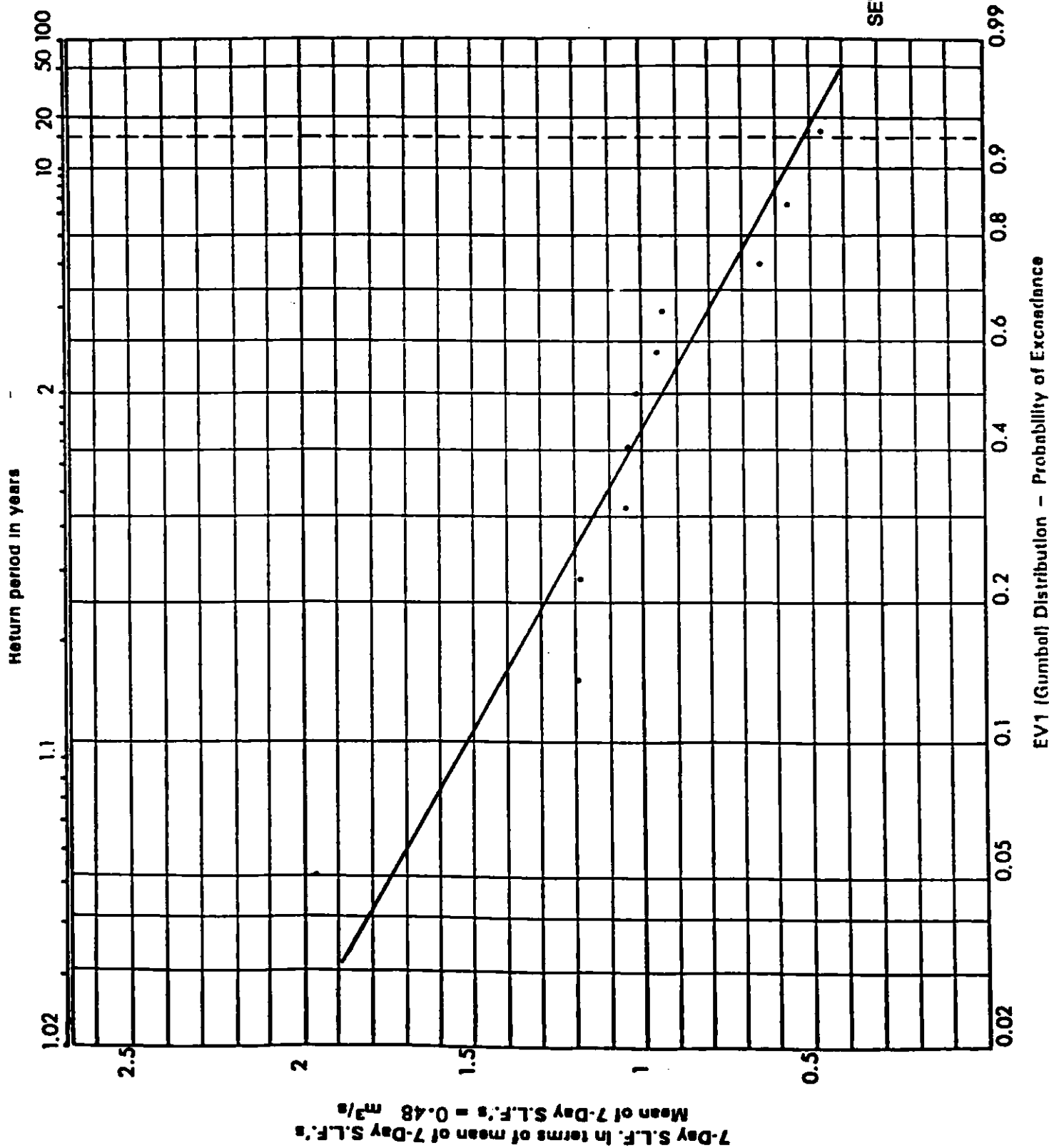
TABLE OF EXCEEDANCE PERCENTILES
Year 1976 Only

5%	10.98	30%	3.99	75%	0.87
10%	7.76	40%	3.33	80%	0.67
15%	6.06	50%	2.53	85%	0.46
20%	5.15	60%	1.55	90%	0.31
25%	4.54	70%	1.05	95%	0.26

** All flow rates above are in cubic metres per second. **

* excl. data for 1985





Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0614
R. GLYDE AT TALLANSTOWN
for period 1976 to 1987
(excl. data for 1985).

STATION NO 0621

Sheet A

Glyde at Mansfieldtown

Body Responsible: OPW

N.G.R.: 0 023 952

Catchment Area to Station: 321.0 sq km
Long Average Rainfall [1941-1970]: 928 mm/yr

Data based on continuous water level records for the period :
13-Aug-55 to 31-Dec-80

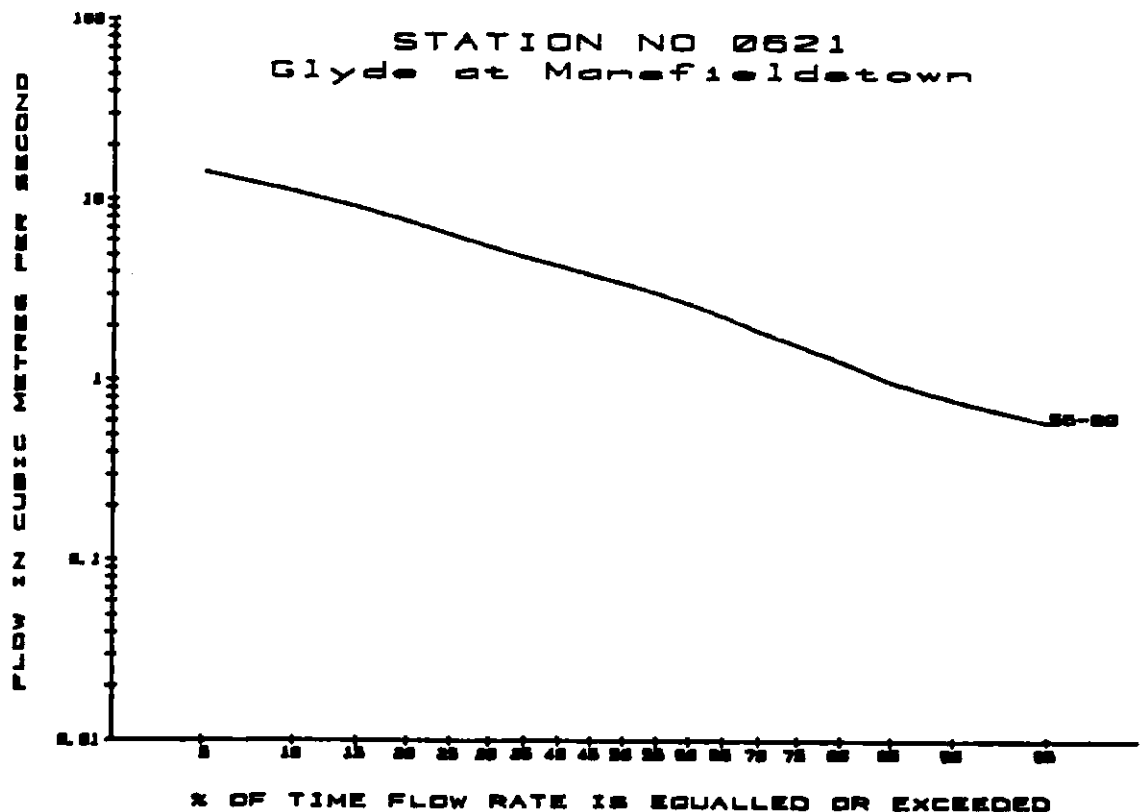
Mean Flow Rate: 4.91 [482 mm/yr rainfall on catchment]

Daily Mean Flows: minimum 0.250 on 5-Sep-59
maximum 44.40 on 1-Jan-79

TABLE OF EXCEEDANCE PERCENTILES

Full period					
5%	14.40	30%	5.60	75%	1.60
10%	11.20	40%	4.40	80%	1.30
15%	9.20	50%	3.50	85%	1.00
20%	7.70	60%	2.70	90%	0.80
25%	6.50	70%	1.90	95%	0.60

** All flow rates above are in cubic metres per second. **



Data for 1981 for
Station No. 0621 MANSFIELDSTOWN
is not available

STATION NO 0621

Sheet C

Glyde at Mansfieldtown

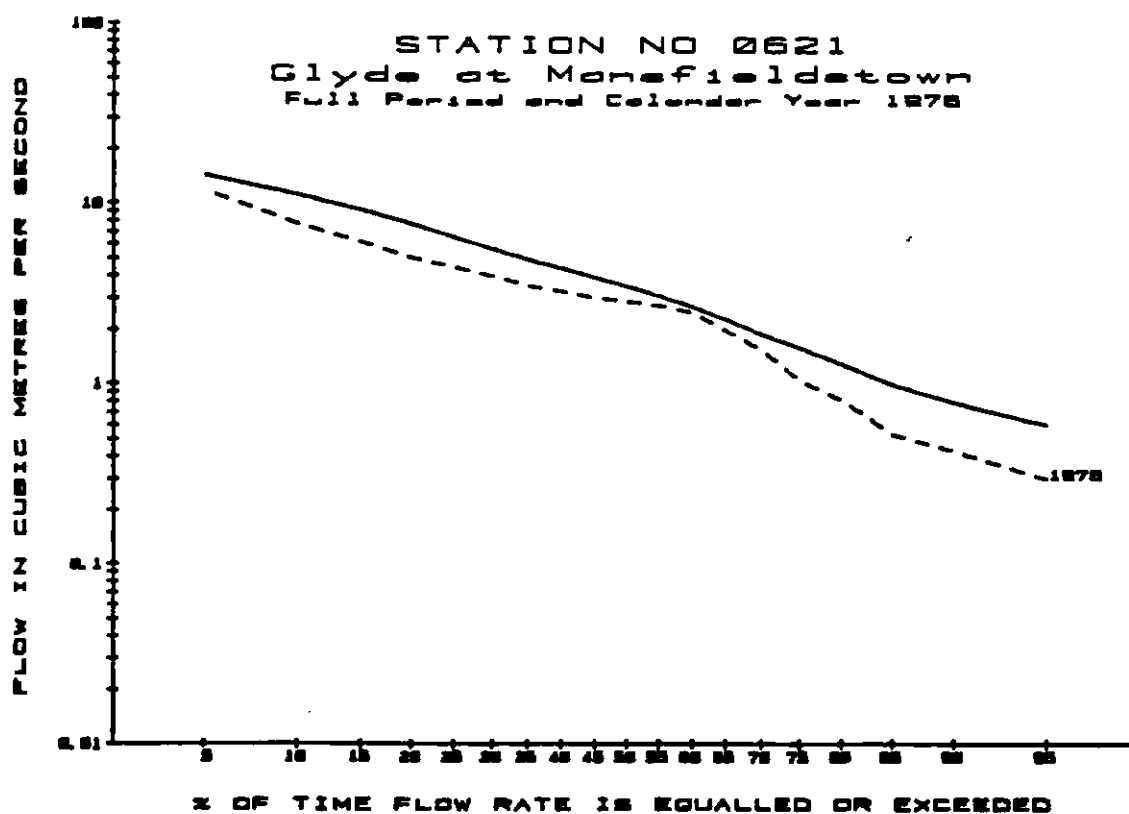
Data based on continuous water level records for the period :
13-Aug-55 to 31-Dec-80

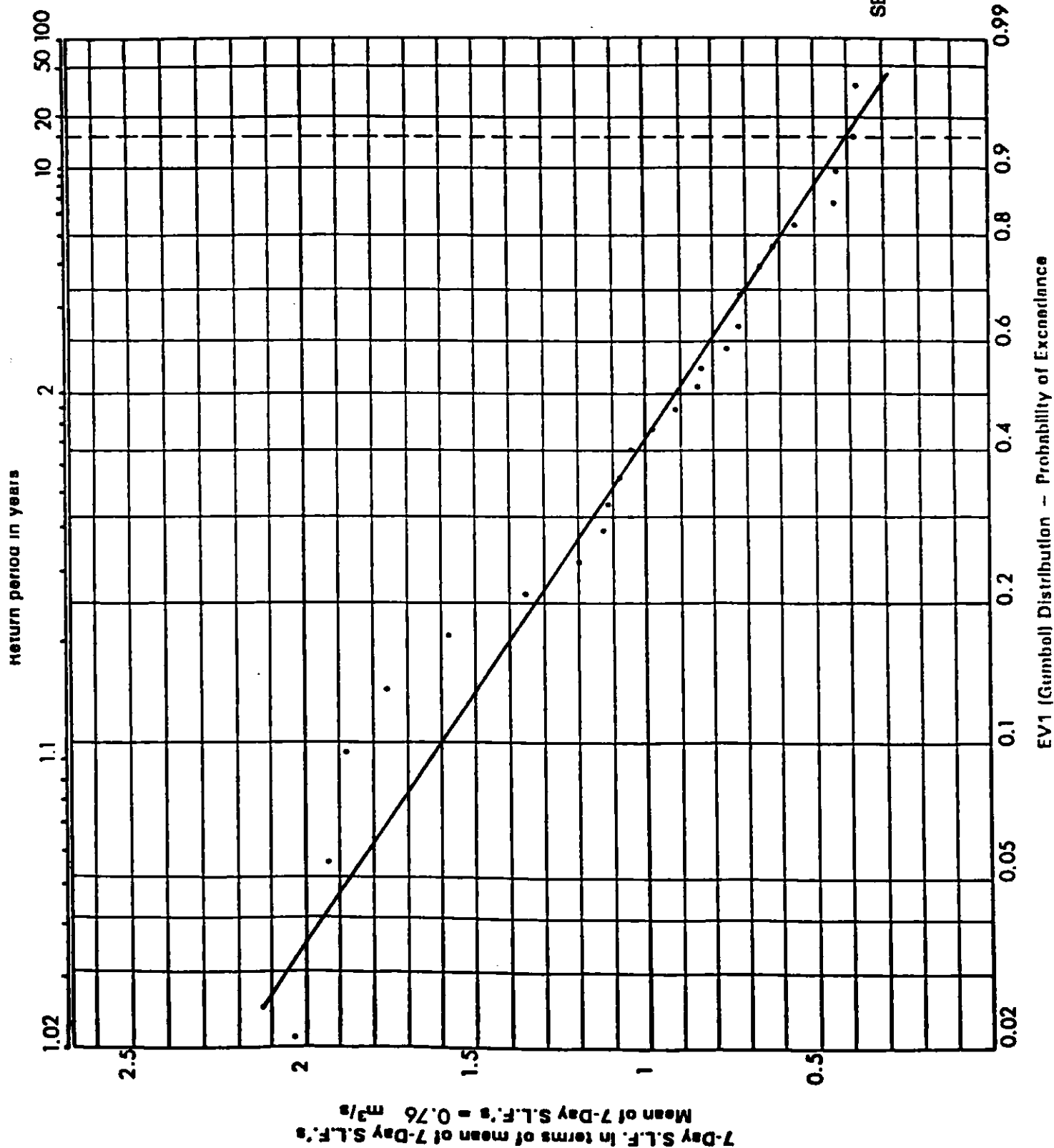
PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1976	0.280	0.290	0.31	0.35	
1955-1980	0.270	0.290	0.31	0.32	[Min]

TABLE OF EXCEEDANCE PERCENTILES

Year 1976 Only					
5%	11.80	30%	3.96	75%	1.05
10%	7.72	40%	3.27	80%	0.82
15%	6.10	50%	2.89	85%	0.53
20%	5.00	60%	2.51	90%	0.43
25%	4.45	70%	1.56	95%	0.30

** All flow rates above are in cubic metres per second. **





Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0621
R. GLYDE AT MANSFIELDSTOWN
for period 1955 to 1980

STATION NO 0625

Sheet A

Dee at Burley

Body Responsible: OPW

N. G. R.: N 925 896

Catchment Area to Station: 176.0 sq km
 Long Average Rainfall [1941-1970]: 930 mm/yr

Data based on continuous water level records for the period :
 1-Jan-72 to 31-Dec-77

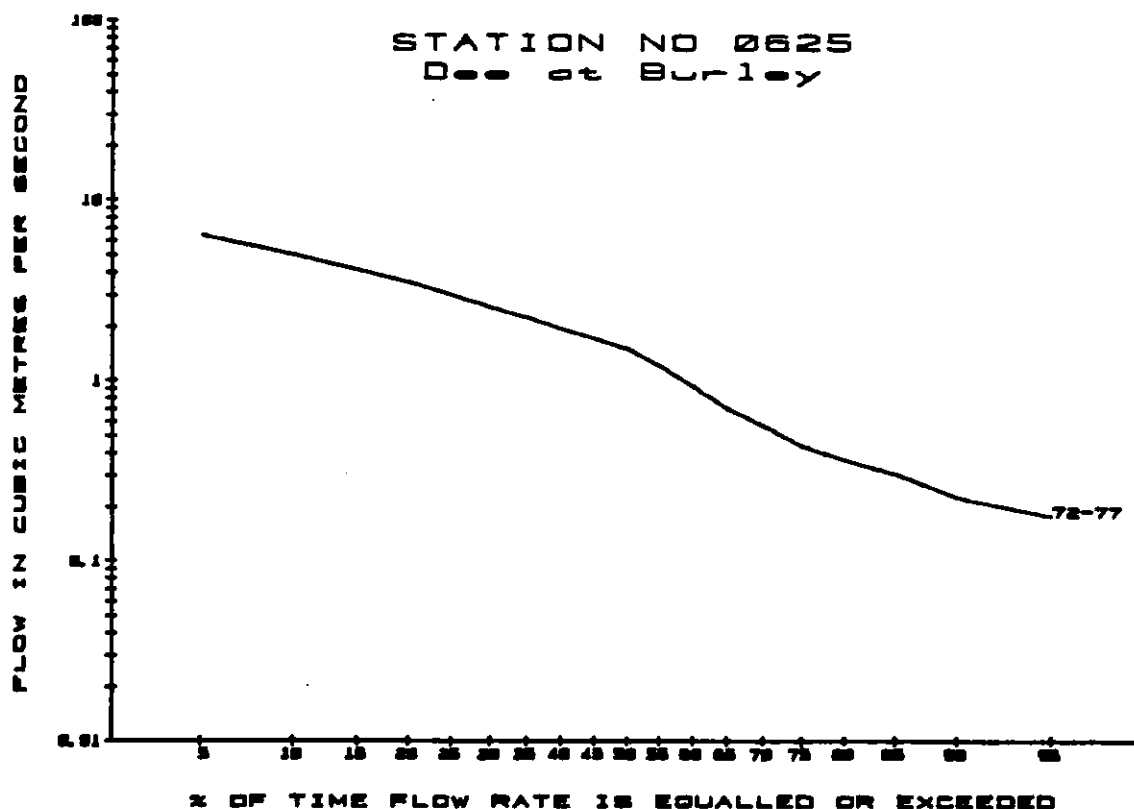
Mean Flow Rate: 2.11 [378 mm/yr rainfall on catchment]

Daily Mean Flows: minimum 0.120 on 16-Sep-76
 maximum 19.30 on 30-Jan-74

TABLE OF EXCEEDANCE PERCENTILES

		Full period			
5%	6.45	30%	2.57	75%	0.44
10%	5.01	40%	1.96	80%	0.37
15%	4.14	50%	1.52	85%	0.31
20%	3.54	60%	0.94	90%	0.23
25%	3.01	70%	0.57	95%	0.18

** All flow rates above are in cubic metres per second. **



Data for 1981 for
Station No. 0625 BURLEY
is not available

STATION NO 0625

Sheet C

Dee at Burley

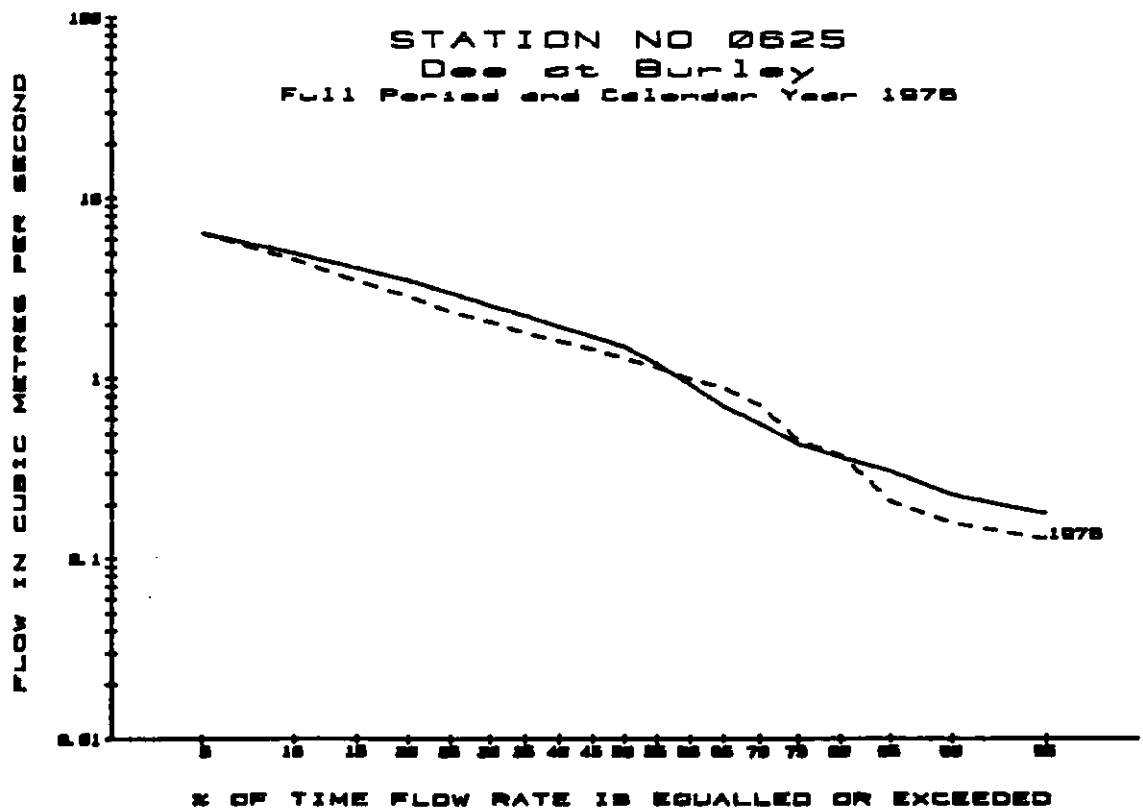
Data based on continuous water level records for the period :
1-Jan-72 to 31-Dec-77

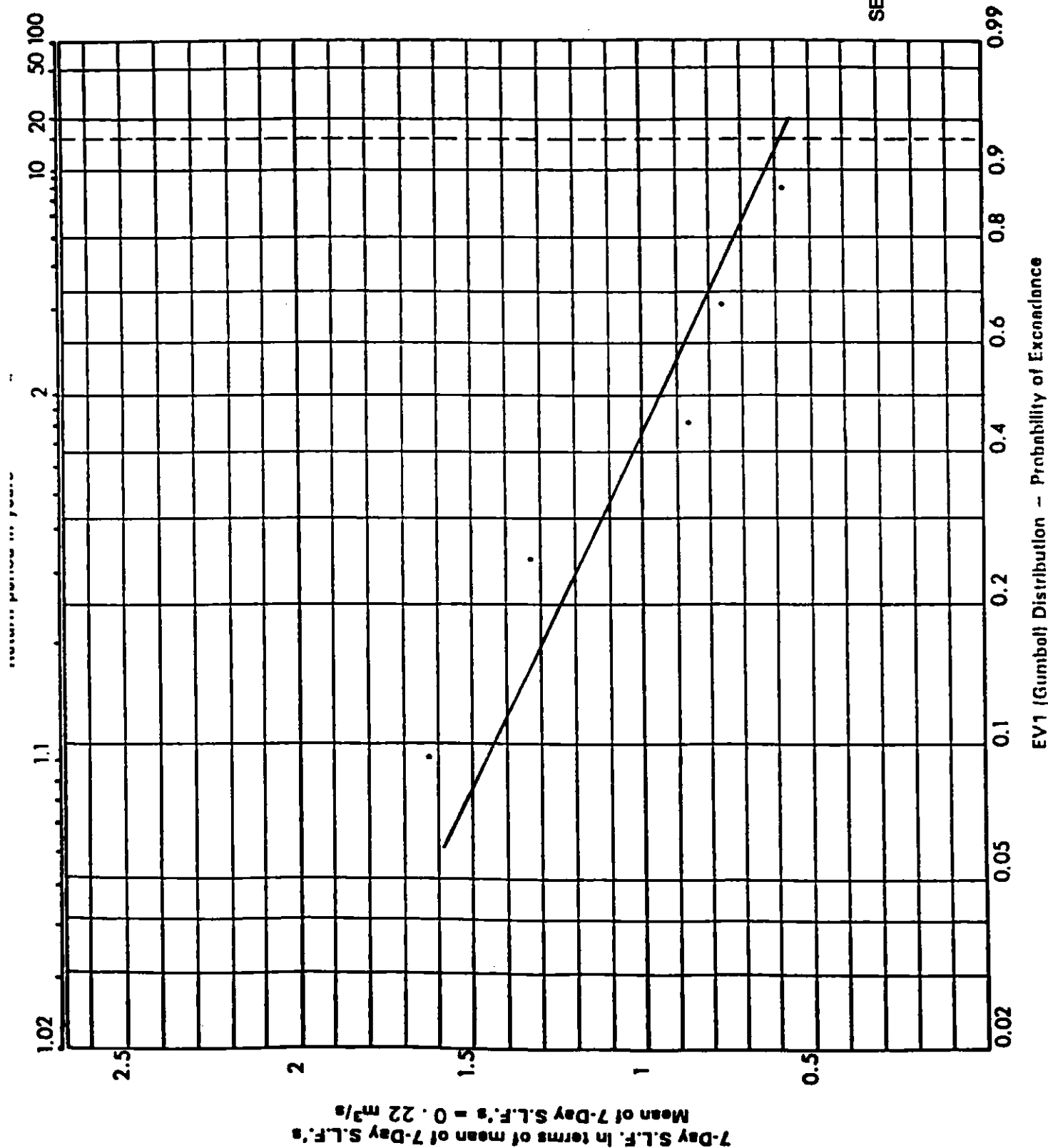
PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1976	0.120	0.130	0.13	0.15	
1972-1977	0.120	0.130	0.13	0.15	[Min]

TABLE OF EXCEEDANCE PERCENTILES

Year 1976 Only					
5%	6.43	30%	2.09	75%	0.46
10%	4.61	40%	1.63	80%	0.38
15%	3.51	50%	1.31	85%	0.21
20%	2.89	60%	1.01	90%	0.16
25%	2.37	70%	0.72	95%	0.13

** All flow rates above are in cubic metres per second. **





Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0625
R. DEE AT BURLEY
for period 1972 to 1977

STATION NO 0626

Sheet A

Lagan at Aclint

Body Responsible: OPW

N.G.R.: N 893 981

Catchment Area to Station: 144.0 sq km
 Long Average Rainfall [1941-1970]: 1072 mm/yr

Data based on continuous water level records for the period :
 1-Jan-72 to 31-Dec-80

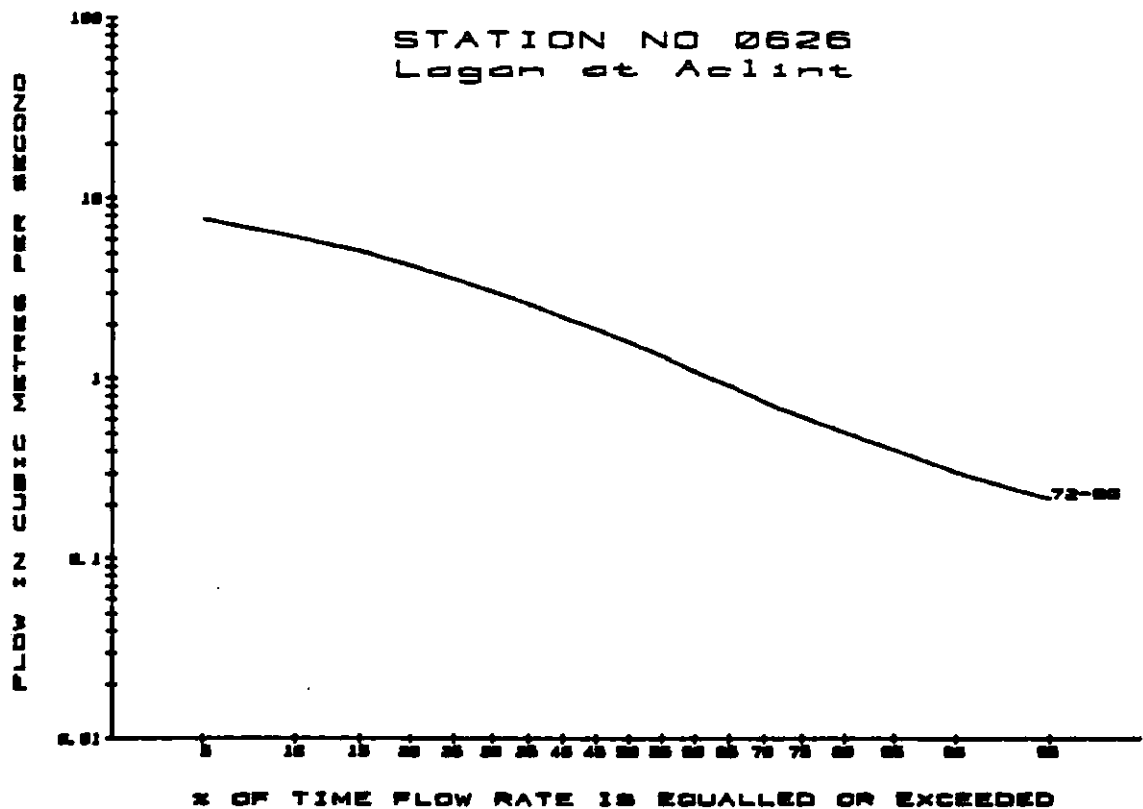
Mean Flow Rate: 2.51 [550 mm/yr rainfall on catchment]

Daily Mean Flows: minimum 0.090 on 10-Jul-75
 maximum 19.00 on 30-Dec-78

TABLE OF EXCEEDANCE PERCENTILES

		Full period			
5%	7.72	30%	3.07	75%	0.62
10%	6.12	40%	2.20	80%	0.51
15%	5.13	50%	1.60	85%	0.41
20%	4.26	60%	1.10	90%	0.31
25%	3.60	70%	0.75	95%	0.22

** All flow rates above are in cubic metres per second. **



Data for 1981 for
Station No. 0626 ACLINT
is not available

STATION NO 0626

Sheet C

Lagan at Aelint

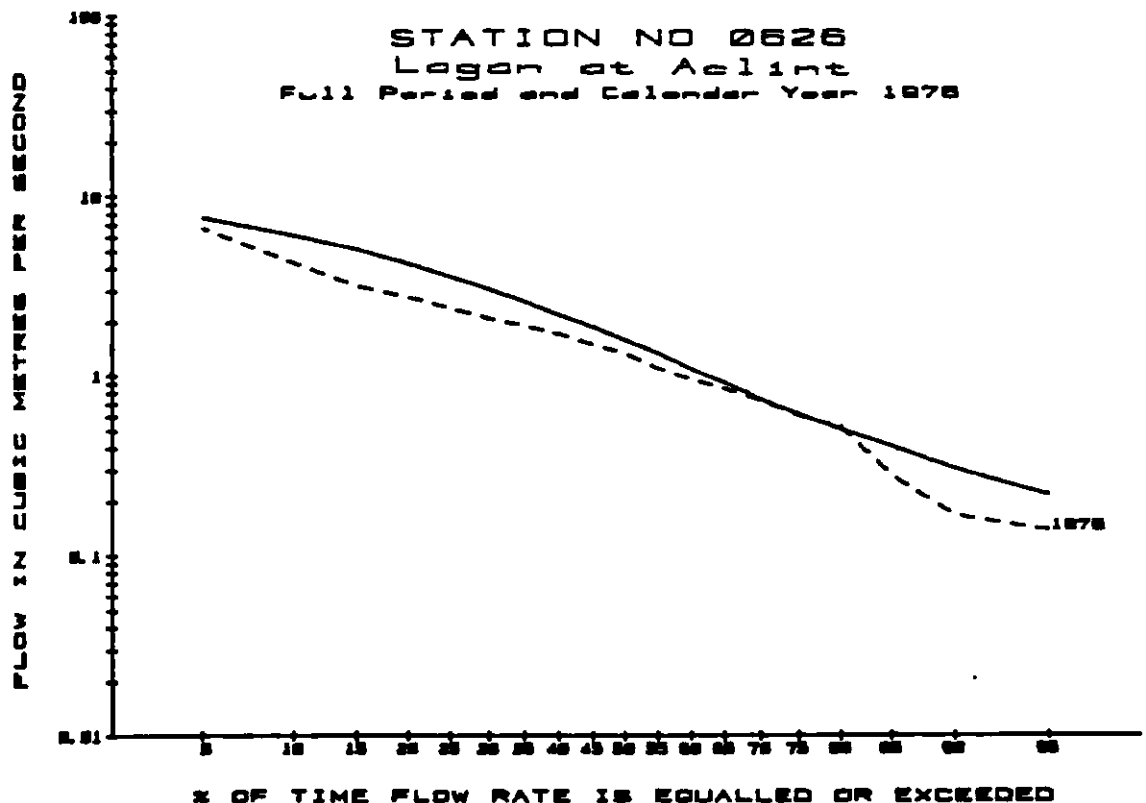
Data based on continuous water level records for the period :
1-Jan-72 to 31-Dec-80

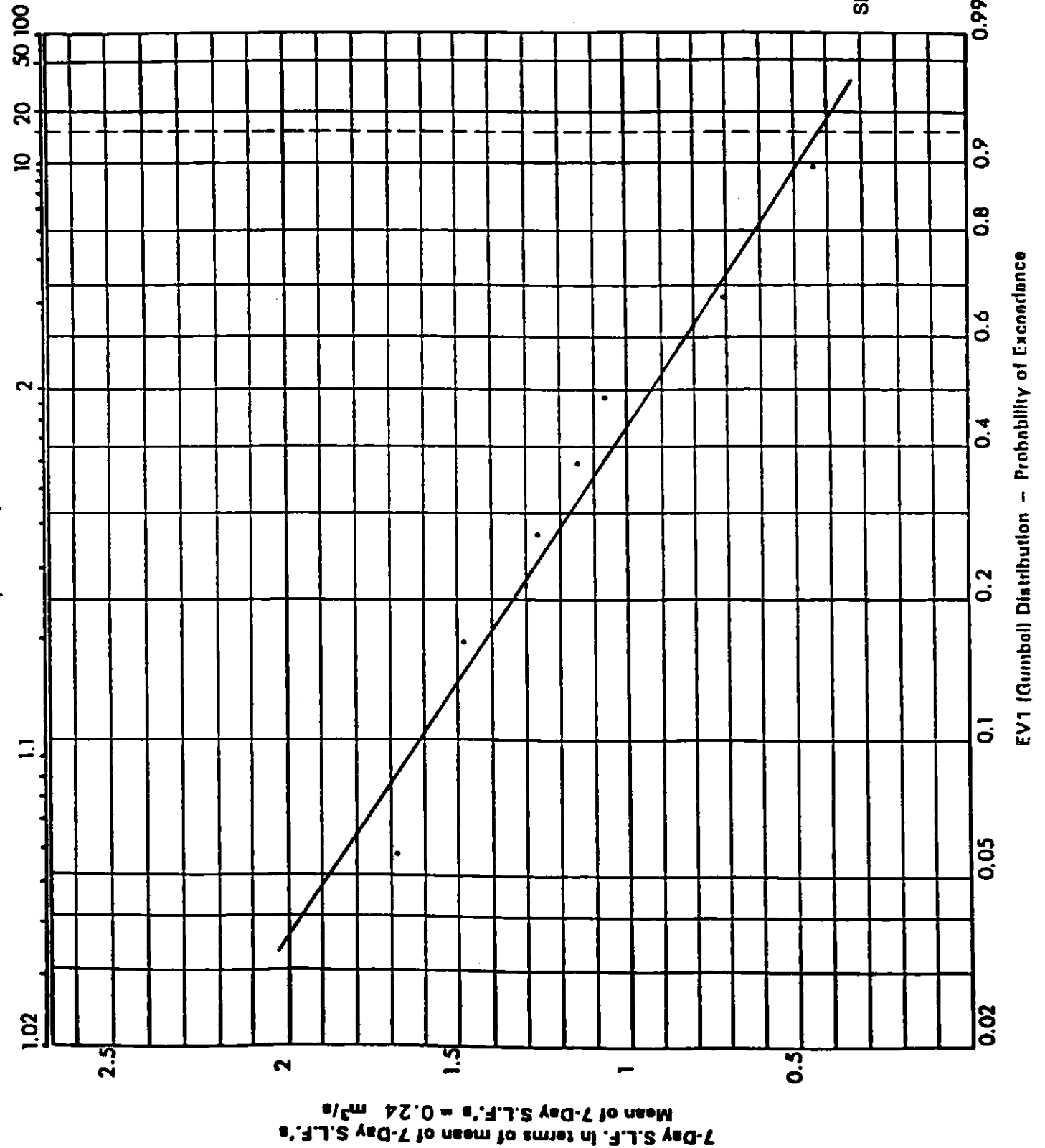
PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1976	0.100	0.110	0.15	0.15	
1972-1980	0.100	0.110	0.15	0.15	[Min]

TABLE OF EXCEEDANCE PERCENTILES

Year 1976 Only					
5%	6.71	30%	2.11	75%	0.61
10%	4.30	40%	1.73	80%	0.52
15%	3.20	50%	1.35	85%	0.28
20%	2.77	60%	0.97	90%	0.17
25%	2.41	70%	0.74	95%	0.14

** All flow rates above are in cubic metres per second. **





Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0626
R. LAGAN AT ACLINT
for period 1972 to 1980

STATION NO 0630

Sheet A

Big at Ballygoly

Body Responsible: LOU

N.G.R.: J 152 100

Catchment Area to Station: 10.2 sq km
 Long Average Rainfall [1941-1970]: 1220 mm/yr

Data based on continuous water level records for the period :
 18-Jan-75 to 31-Dec-87

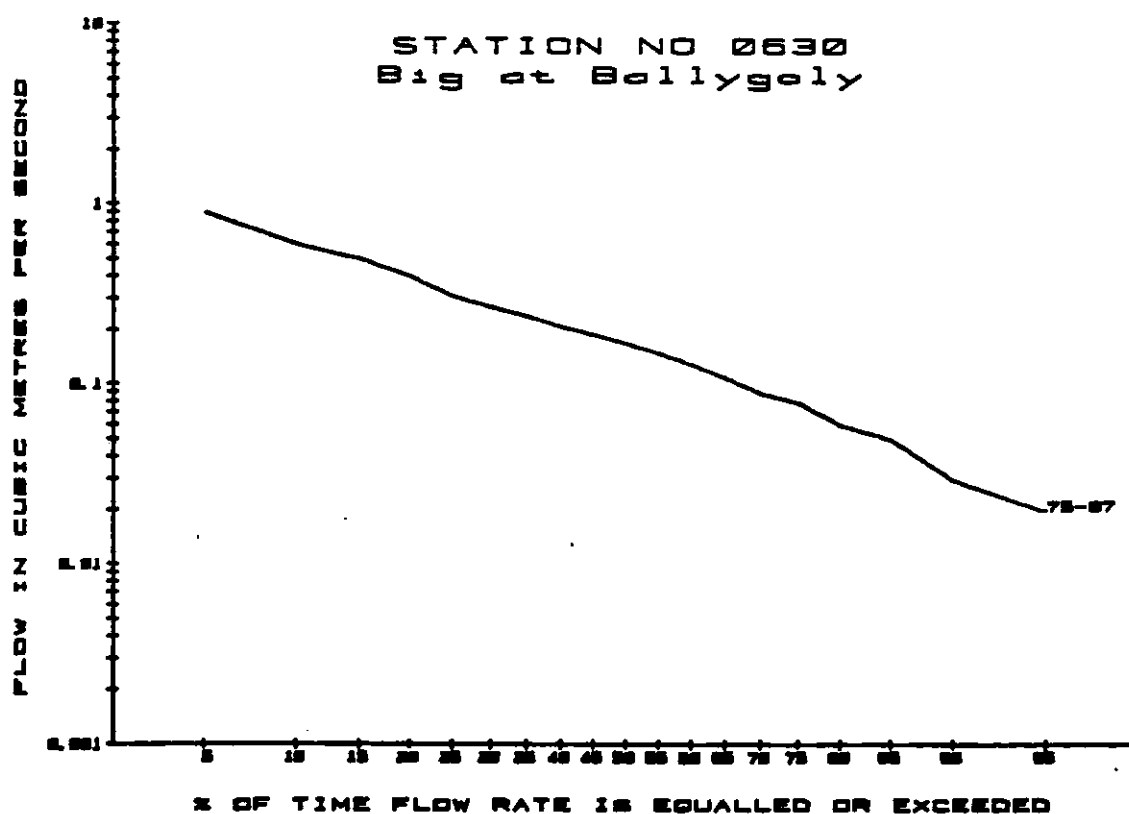
Mean Flow Rate: 0.30 [946 mm/yr rainfall on catchment]

Daily Mean Flow: minimum 0.010 on 14-Aug-83
 maximum 35.70 on 27-Dec-78

TABLE OF EXCEEDANCE PERCENTILES

Full period					
5%	0.90	30%	0.27	75%	0.08
10%	0.60	40%	0.21	80%	0.06
15%	0.50	50%	0.17	85%	0.05
20%	0.40	60%	0.13	90%	0.03
25%	0.31	70%	0.09	95%	0.02

** All flow rates above are in cubic metres per second. **



STATION NO 0630

Sheet B

Big at Ballygoly

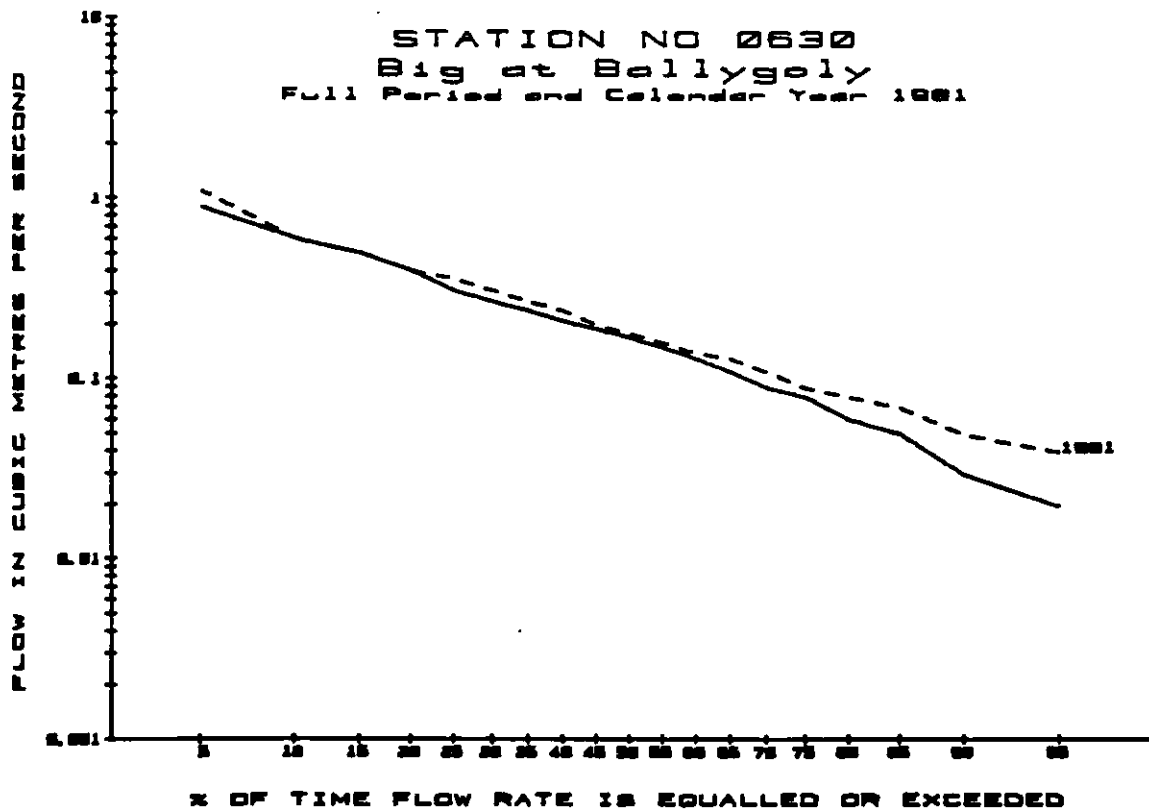
Data based on continuous water level records for the period :
18-Jan-75 to 31-Dec-87

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	0.026	0.030	0.05	0.09	
1975-1987	0.022	0.030	0.04	0.09	[Average]

TABLE OF EXCEEDANCE PERCENTILES

Year 1981 Only					
5%	1.10	30%	0.31	75%	0.09
10%	0.60	40%	0.24	80%	0.08
15%	0.50	50%	0.18	85%	0.07
20%	0.40	60%	0.14	90%	0.05
25%	0.36	70%	0.11	95%	0.04

** All flow rates above are in cubic metres per second. **



Big at Ballygoly

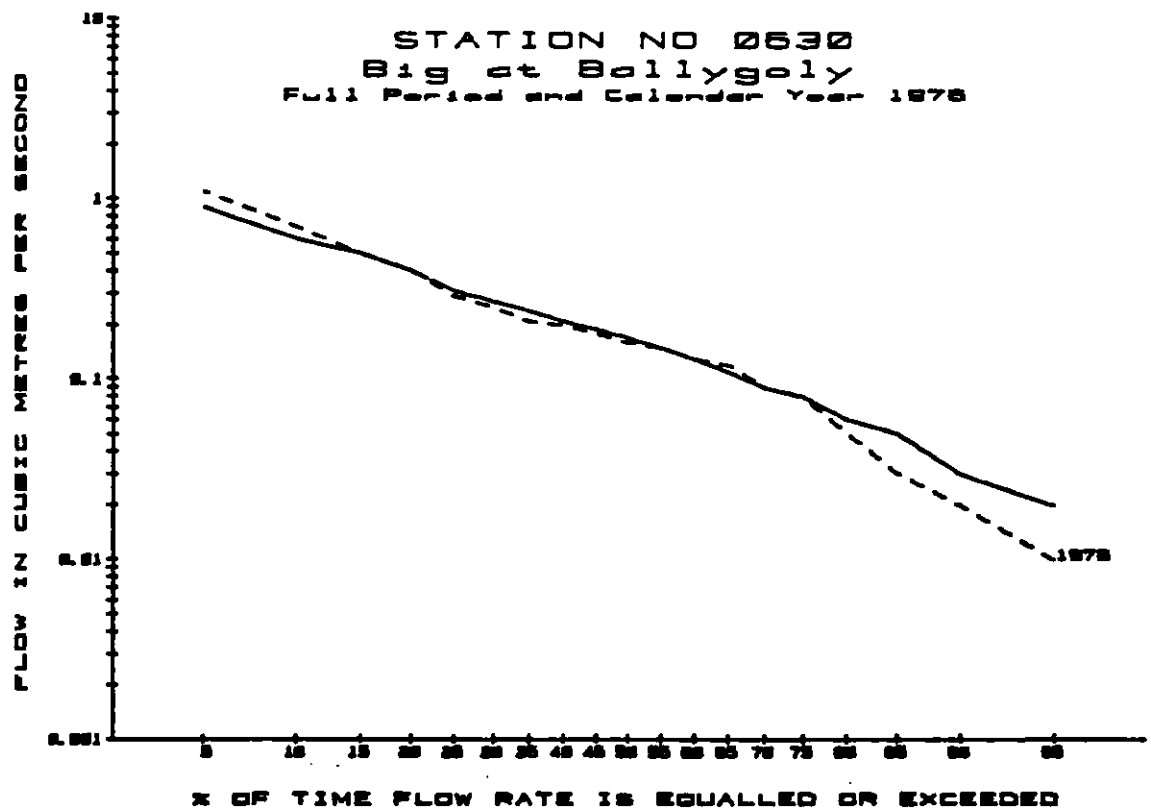
Data based on continuous water level records for the period :
18-Jan-75 to 31-Dec-87

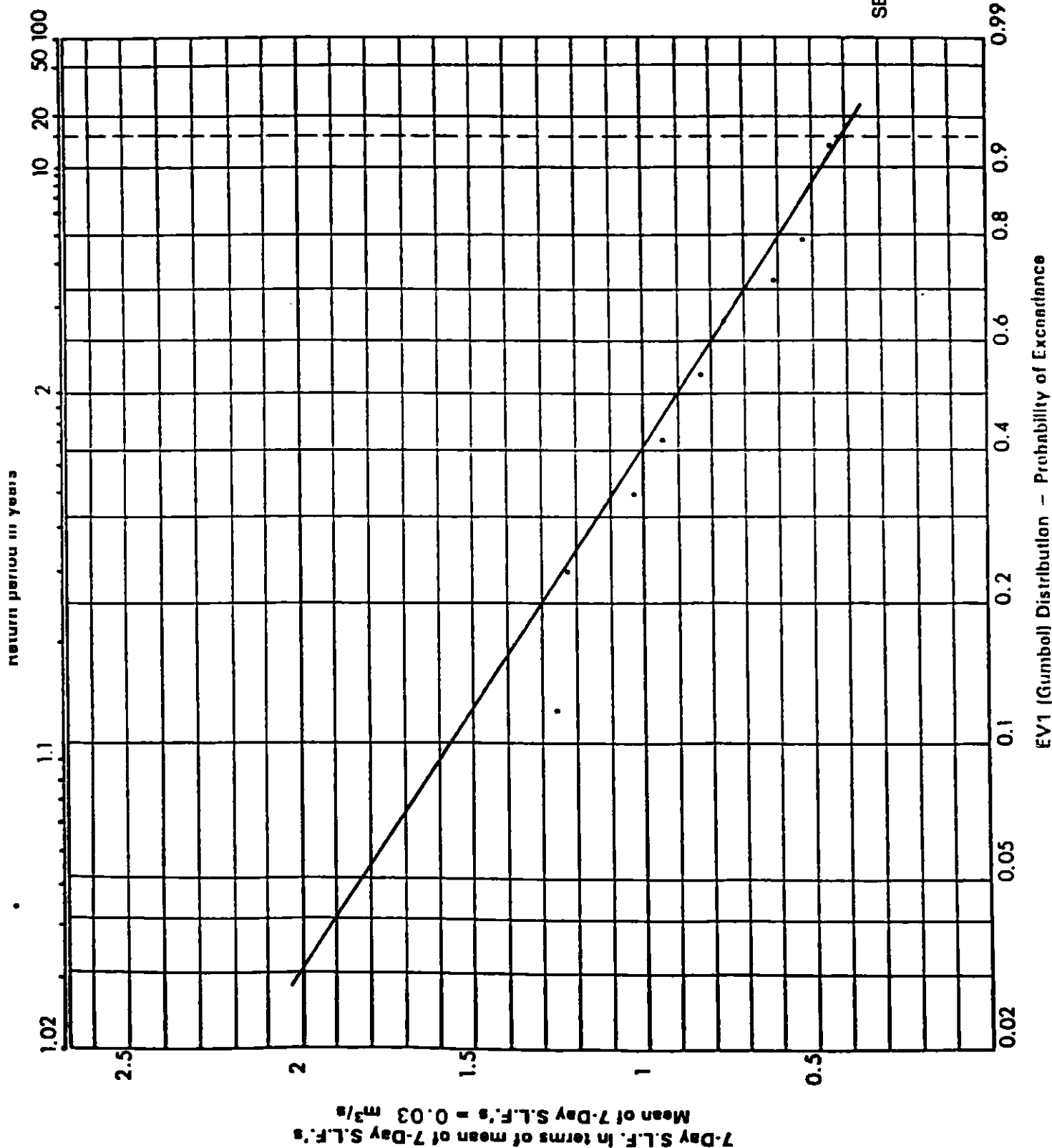
PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1976	0.014	0.010	0.01	0.02	
1975-1987	0.010	0.010	0.01	0.02	[Min]

TABLE OF EXCEEDANCE PERCENTILES

Year 1976 Only					
5%	1.10	30%	0.25	75%	0.08
10%	0.70	40%	0.20	80%	0.05
15%	0.50	50%	0.16	85%	0.03
20%	0.40	60%	0.13	90%	0.02
25%	0.29	70%	0.09	95%	0.01

** All flow rates above are in cubic metres per second. **





Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0630
R. BIG AT BALLYGOLY
for period 1975 to 1987

STATION NO 0631

Sheet A

Flurry at Curralhir bridge

Body Responsible: LOU

N.G.R.: J 083 143

Catchment Area to Station: 45.3 sq km
Long Average Rainfall [1941-1970]: 1104 mm/yr

Data based on continuous water level records for the period :
21-Jan-75 to 31-Dec-87

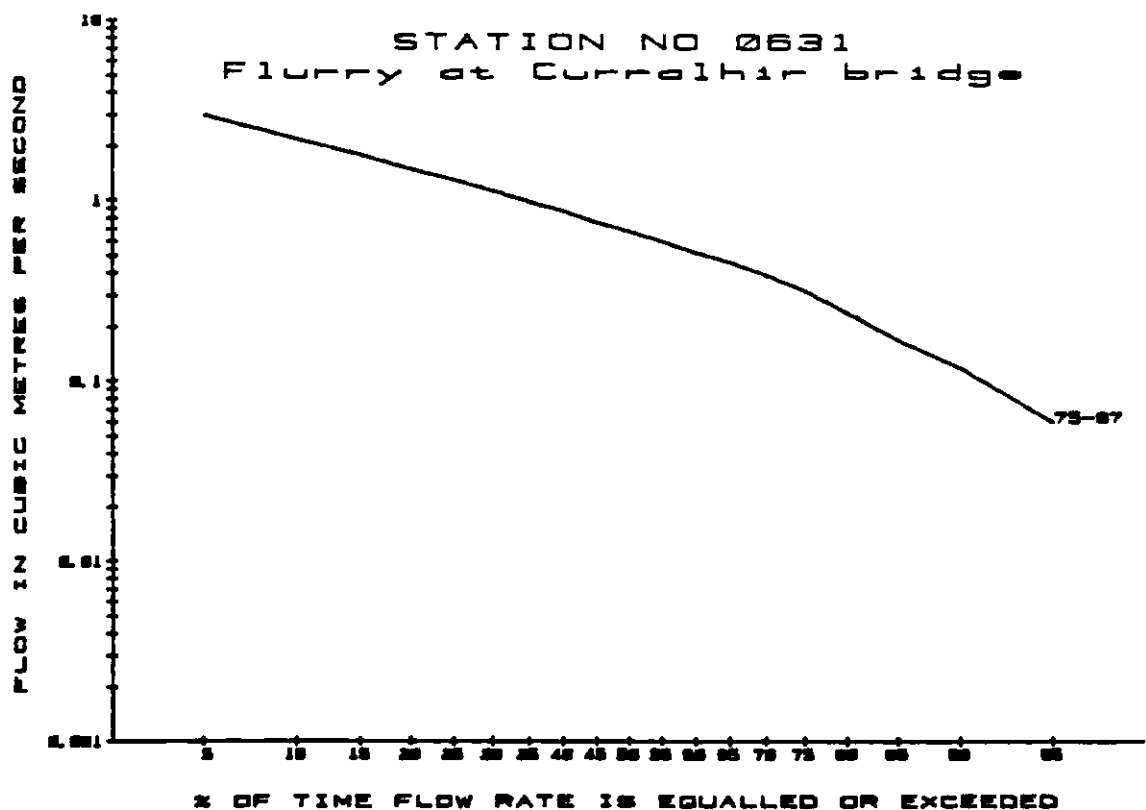
Mean Flow Rates: 1.03 [722 mm/yr rainfall on catchment]

Daily Mean Flows: minimum 0.027 on 16-Aug-75
maximum 26.65 on 28-Dec-78

TABLE OF EXCEEDANCE PERCENTILES

Full period					
5%	3.00	30%	1.14	75%	0.32
10%	2.20	40%	0.98	80%	0.24
15%	1.80	50%	0.68	85%	0.17
20%	1.50	60%	0.52	90%	0.12
25%	1.31	70%	0.39	95%	0.06

** All flow rates above are in cubic metres per second. **



Flurry at Curralhir bridge

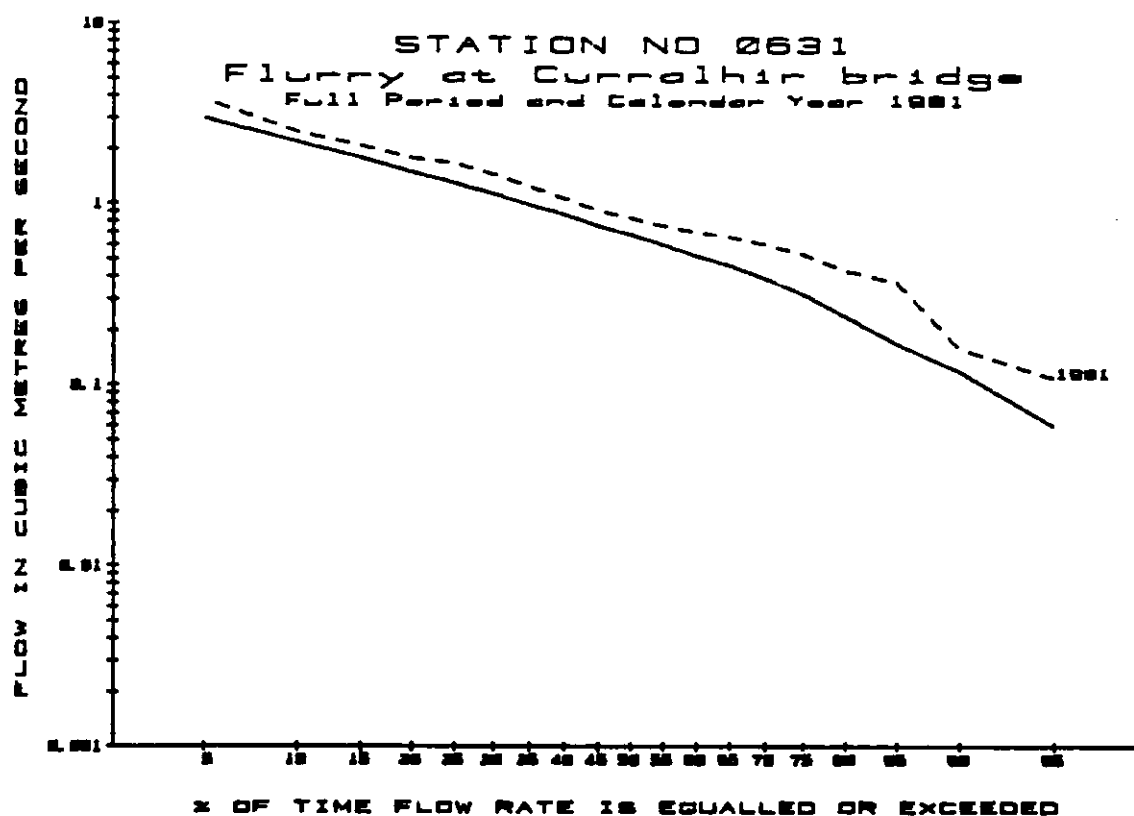
Data based on continuous water level records for the period :
21-Jan-75 to 31-Dec-87

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	0.086	0.090	0.12	0.17	
1975-1987	0.090	0.100	0.13	0.47	[Average]

TABLE OF EXCEEDANCE PERCENTILES

Year 1981 Only					
5%	3.80	30%	1.46	75%	0.53
10%	2.50	40%	1.08	80%	0.43
15%	2.10	50%	0.84	85%	0.37
20%	1.80	60%	0.70	90%	0.16
25%	1.68	70%	0.60	95%	0.11

** All flow rates above are in cubic metres per second. **



Flurry at Curralhir bridge

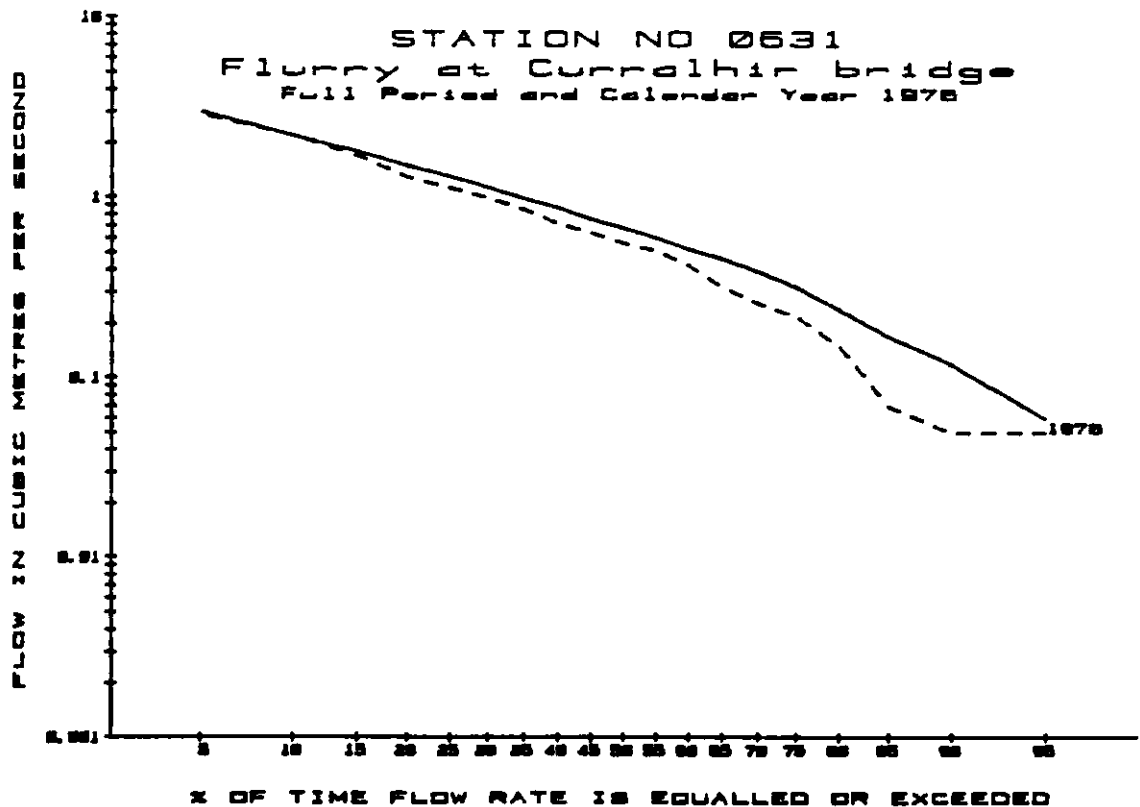
Data based on continuous water level records for the period :
21-Jan-75 to 31-Dec-87

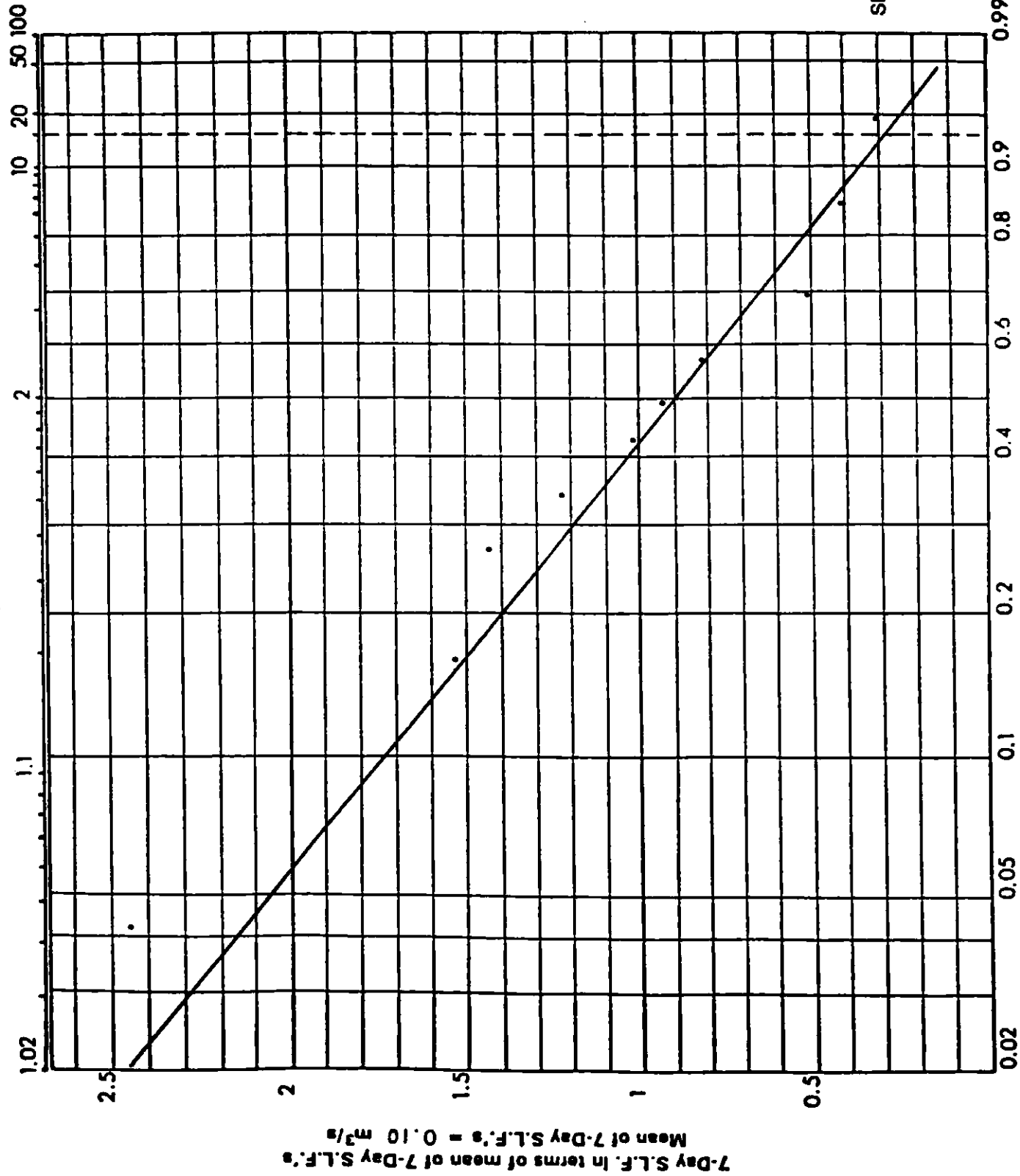
PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1976	0.037	0.040	0.05	0.06	
1975-1987	0.029	0.030	0.04	0.04	[Min]

TABLE OF EXCEEDANCE PERCENTILES

Year 1976 Only					
5%	2.90	30%	1.00	75%	0.22
10%	2.20	40%	0.72	80%	0.15
15%	1.70	50%	0.56	85%	0.07
20%	1.30	60%	0.42	90%	0.05
25%	1.13	70%	0.26	95%	0.05

** All flow rates above are in cubic metres per second. **





Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0631
R. FLURRY AT CURRALHIR
for period 1975 to 1987

STATION NO 0633

Sheet A

White at Coneyburrow bridge

Body Responsible: LOU

N.G.R.: 0 056 893

Catchment Area to Station: 57.4 sq km
 Long Average Rainfall [1941-1970]: 957 mm/yr

Data based on continuous water level records for the period :
 1-Jan-77 to 31-Dec-87 *

Mean Flow Rate: 0.82 [451 mm/yr rainfall on catchment]

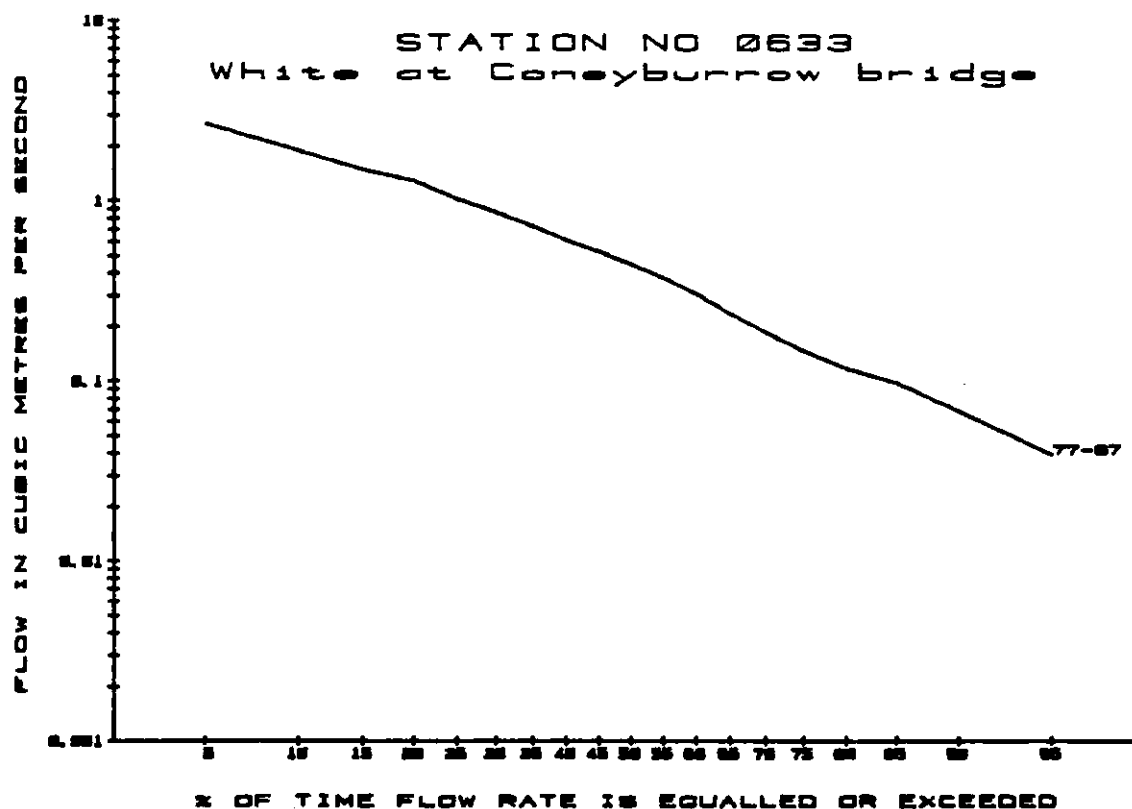
Daily Mean Flows: minimum < 0.010 on 15-Aug-77
 maximum 34.90 on 21-Jan-80

TABLE OF EXCEEDANCE PERCENTILES

		Full period			
5%	2.70	30%	0.87	75%	0.15
10%	1.90	40%	0.61	80%	0.12
15%	1.50	50%	0.45	85%	0.10
20%	1.30	60%	0.31	90%	0.07
25%	1.03	70%	0.19	95%	0.04

** All flow rates above are in cubic metres per second. **

* excl. data for 1978 and 1979



STATION NO 0633

Sheet B

White at Coneyburrow bridge

Data based on continuous water level records for the period :
1-Jan-77 to 31-Dec-87 *

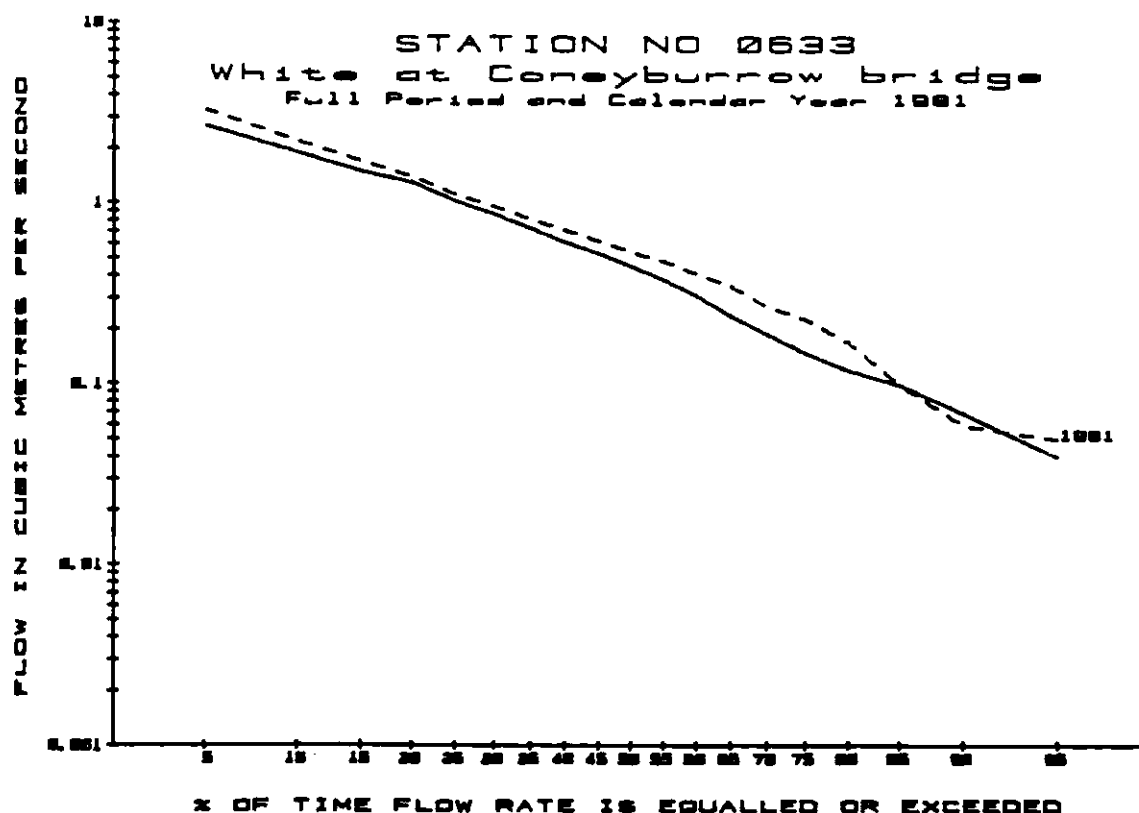
PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	0.041	0.040	0.05	0.07	
1977-1987	0.061	0.070	0.08	0.14	[Average]

TABLE OF EXCEEDANCE PERCENTILES

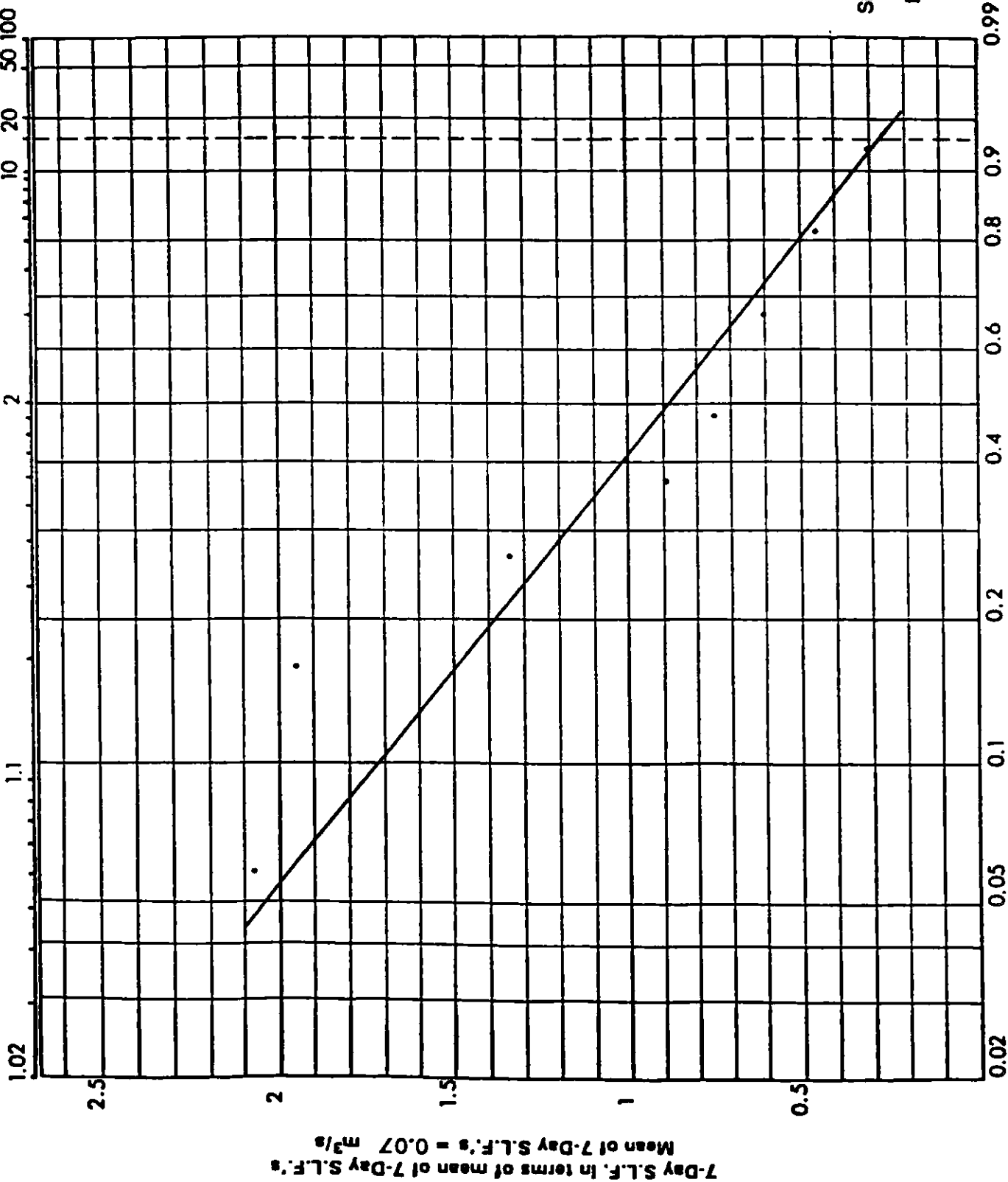
Year 1981 Only					
5%	3.30	30%	0.96	75%	0.23
10%	2.20	40%	0.71	80%	0.17
15%	1.70	50%	0.54	85%	0.10
20%	1.40	60%	0.41	90%	0.06
25%	1.12	70%	0.27	95%	0.05

** All flow rates above are in cubic metres per second. **

* excl. data for 1978 and 1979



Data for 1976 for
Station No. 0633 CONEYBURROW BR.
is not available



Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0633
R. WHITE AT CONEYBURROW BR.
for period 1977 to 1987
(excl. data for 1978, 1979).

STATION NO 0701

Sheet A

TREMBLESTOWN at TREMBLESTOWN

Body Responsible: OPW

N. G. R.: N 758 574

Catchment Area to Station: 150.0 sq km
Long Average Rainfall [1941-1970]: 950 mm/yr

Data based on continuous water level records for the period :
21-May-75 to 31-Dec-81

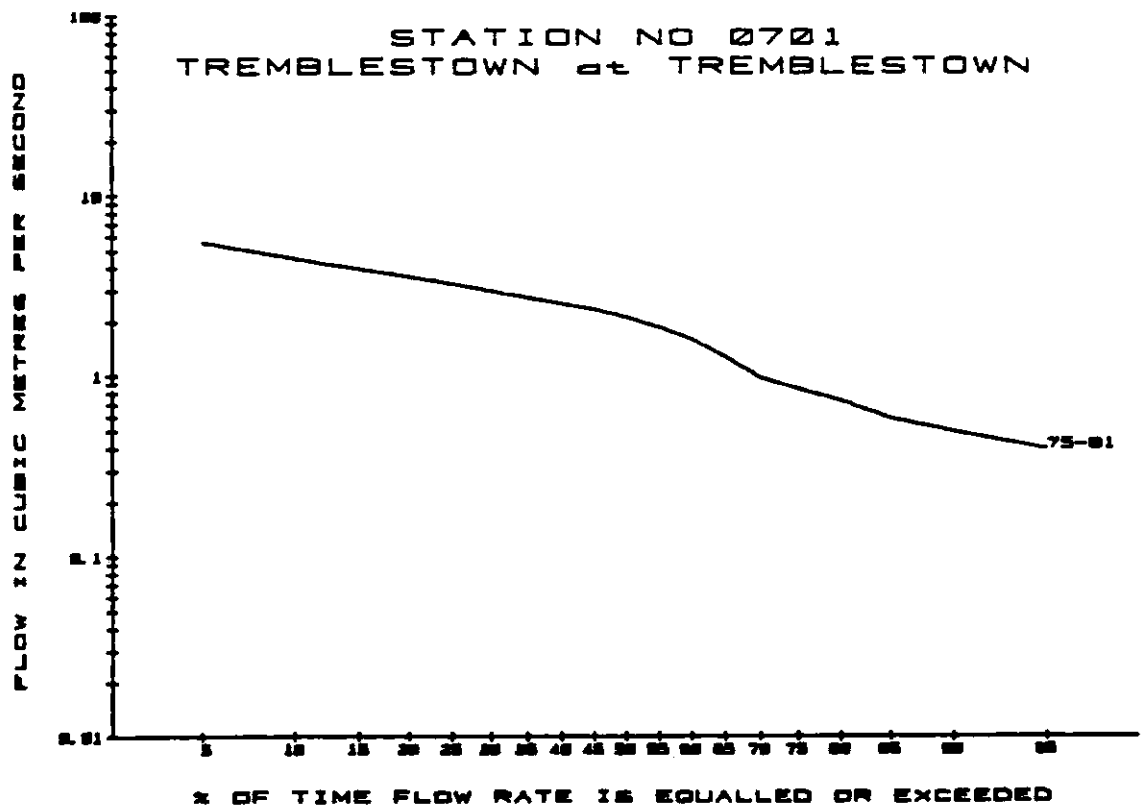
Mean Flow Rate: 2.36 [496 mm/yr rainfall on catchment]

Daily Mean Flows: minimum 0.100 on 19-Sep-76
maximum 17.40 on 28-Dec-78

TABLE OF EXCEEDANCE PERCENTILES

		Full period			
5%	5.58	30%	3.00	75%	0.86
10%	4.53	40%	2.55	80%	0.74
15%	3.97	50%	2.14	85%	0.59
20%	3.60	60%	1.62	90%	0.50
25%	3.28	70%	0.99	95%	0.40

** All flow rates above are in cubic metres per second. **



STATION NO 0701

Sheet B

TREMBLESTOWN at TREMBLESTOWN

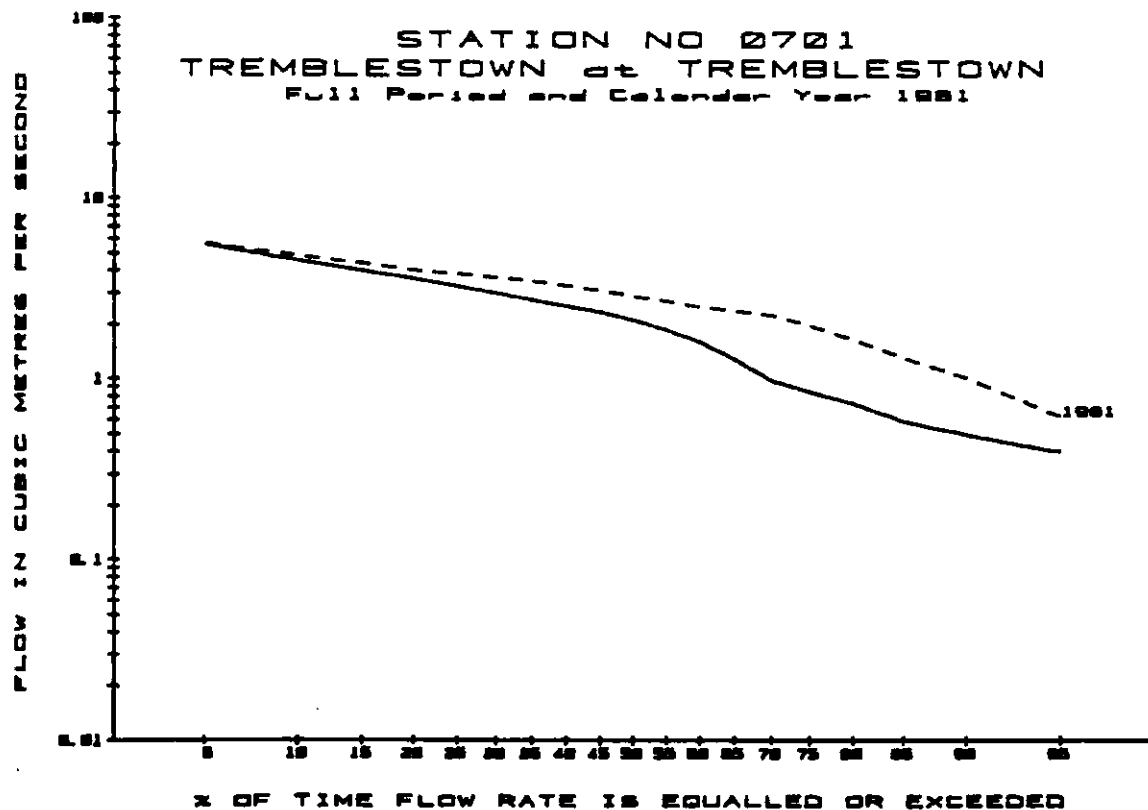
Data based on continuous water level records for the period :
21-May-75 to 31-Dec-81

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	0.570	0.590	0.66	0.80	
1975-1981	0.400	0.440	0.51	0.62	[Average]

TABLE OF EXCEEDANCE PERCENTILES

Year 1981 Only					
5%	5.67	30%	3.67	75%	2.00
10%	4.82	40%	3.30	80%	1.67
15%	4.37	50%	2.89	85%	1.32
20%	4.00	60%	2.53	90%	1.03
25%	3.84	70%	2.27	95%	0.63

** All flow rates above are in cubic metres per second. **



STATION NO 0701

Sheet C

Trembletown at Trembletown

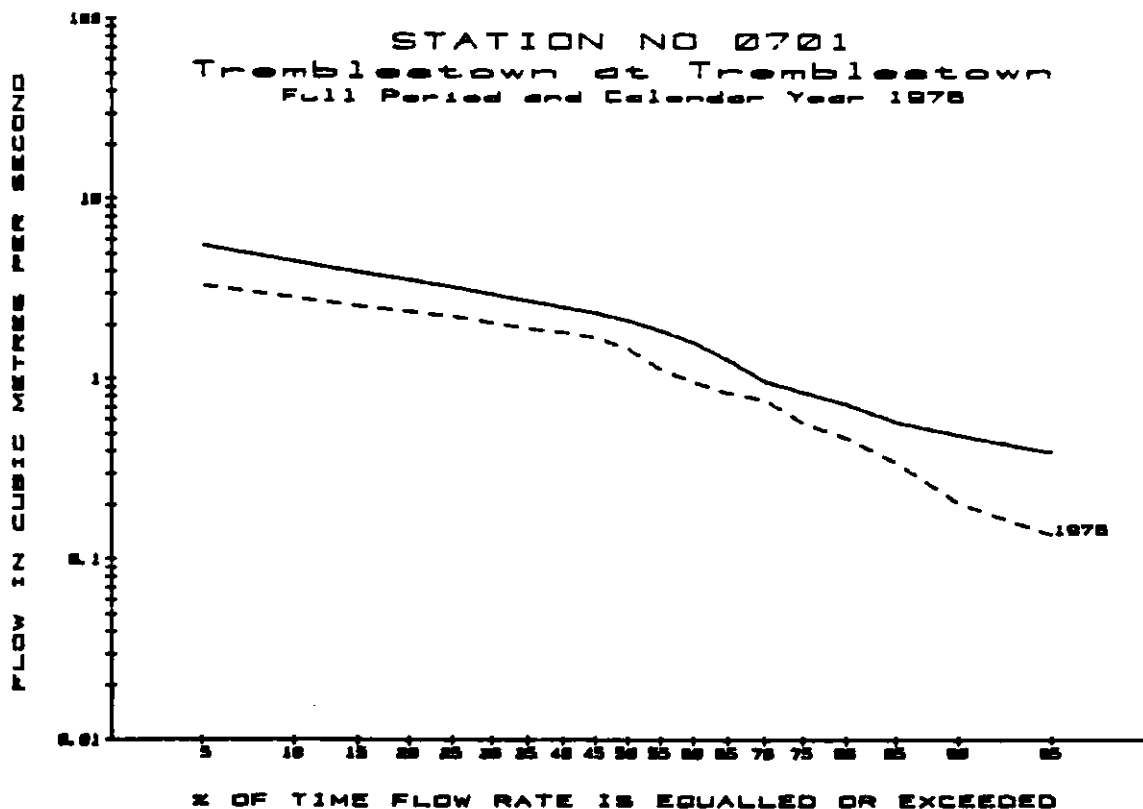
Data based on continuous water level records for the period :
21-May-75 to 31-Dec-81

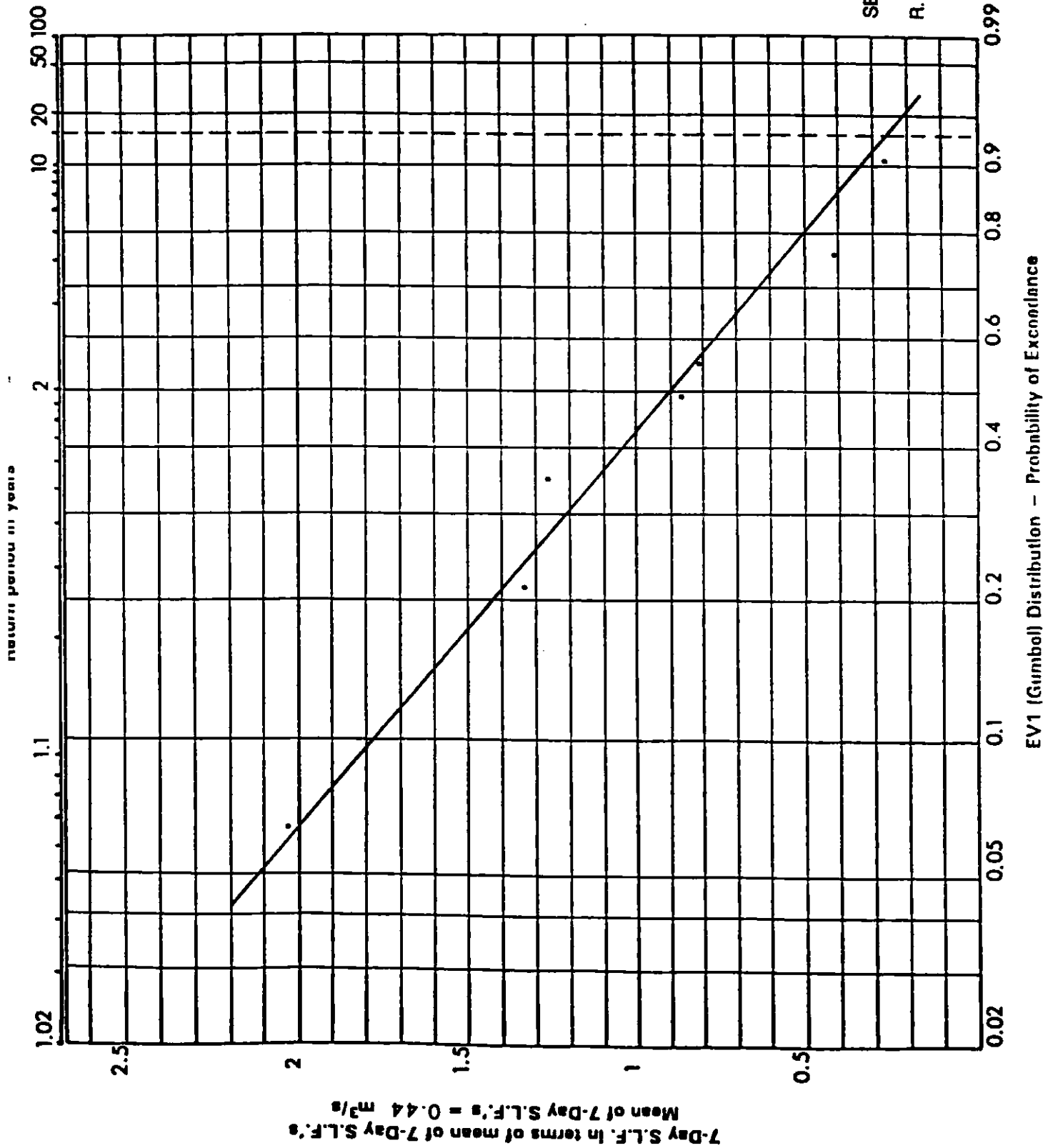
PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1976	0.120	0.120	0.17	0.16	
1975-1981	0.120	0.120	0.17	0.18	[Min]

TABLE OF EXCEEDANCE PERCENTILES

Year 1976 Only					
5%	3.34	30%	2.08	75%	0.58
10%	2.86	40%	1.85	80%	0.48
15%	2.58	50%	1.50	85%	0.35
20%	2.40	60%	0.98	90%	0.21
25%	2.26	70%	0.78	95%	0.14

++ All flow rates above are in cubic metres per second. ++





Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0701
R. TREMBLESTOWN AT TREMBLESTOWN
for period 1975 to 1981

STATION NO 0705

Sheet A

Boyne at Trim

Body Responsible: OPW

N.G.R. : N 802 568

Catchment Area to Station: 1282.0 sq km
Long Average Rainfall [1941-1970]: 913 mm/yr

Data based on continuous water level records for the period :
28-Aug-75 to 31-Dec-81

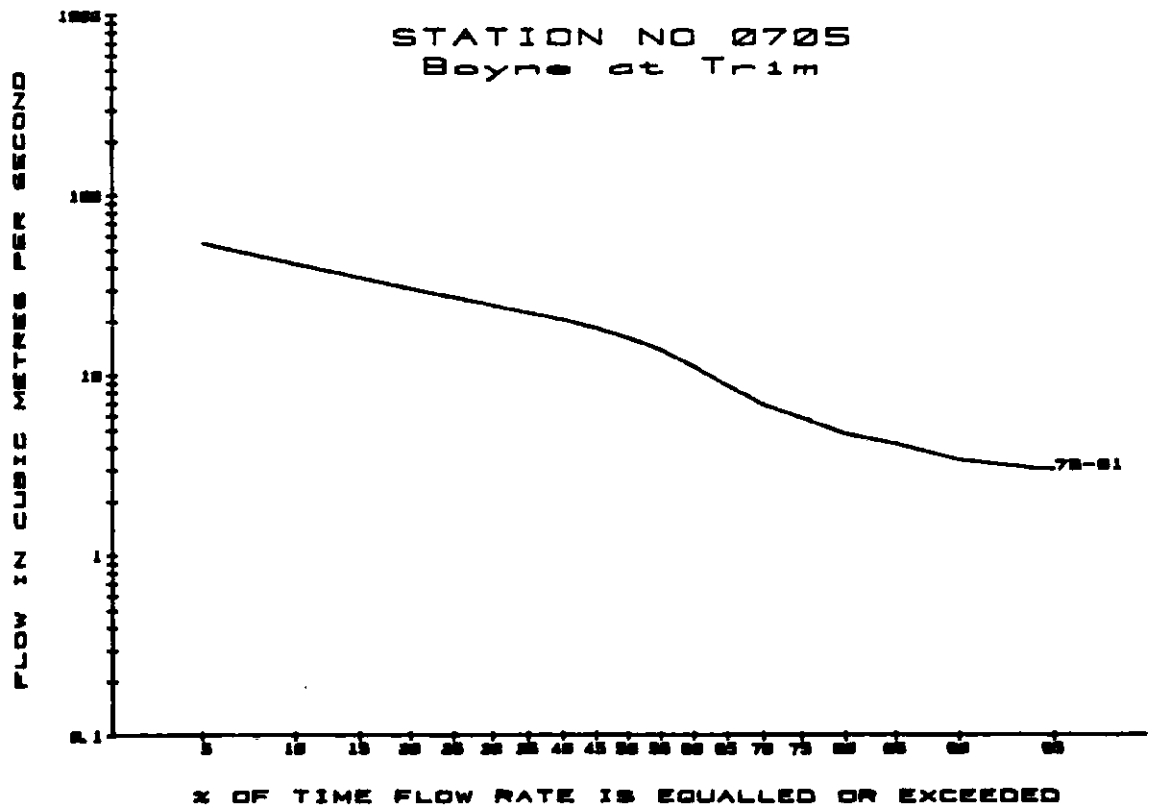
Mean Flow Rate: 20.07 [494 mm/yr rainfall on catchment]

Daily Mean Flows: minimum 1.730 on 7-Sep-76
maximum 142.80 on 28-Dec-78

TABLE OF EXCEEDANCE PERCENTILES

		Full period			
5%	55.00	30%	24.80	75%	5.92
10%	42.00	40%	20.70	80%	4.84
15%	35.40	50%	16.40	85%	4.27
20%	30.70	60%	11.40	90%	3.48
25%	27.60	70%	6.99	95%	3.02

** All flow rates above are in cubic metres per second. **



STATION NO 0705

Sheet B

Boyne at Trim

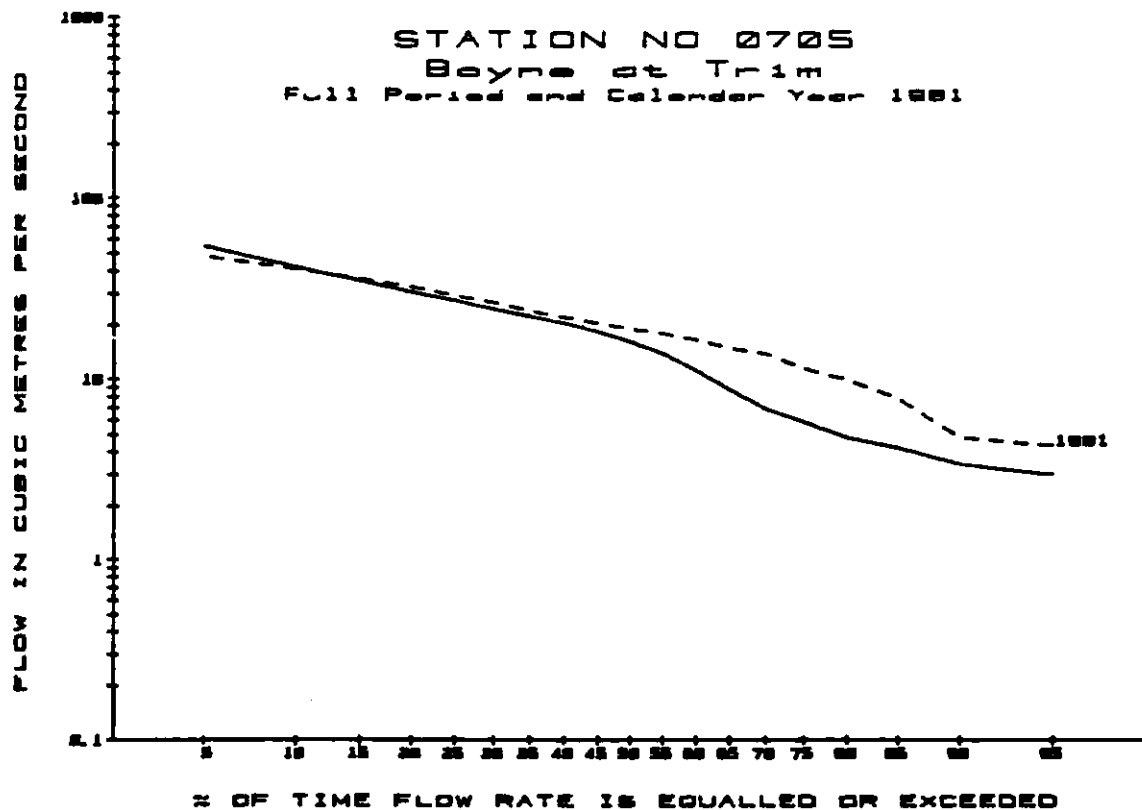
Data based on continuous water level records for the period :
28-Aug-75 to 31-Dec-81

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	3.350	3.660	4.31	4.69	
1975-1981	2.920	3.090	3.41	5.83	[Average]

TABLE OF EXCEEDANCE PERCENTILES

Year 1981 Only					
5%	48.30	30%	26.90	75%	11.70
10%	40.90	40%	22.30	80%	10.10
15%	36.30	50%	19.20	85%	8.02
20%	32.80	60%	16.80	90%	4.88
25%	29.40	70%	14.10	95%	4.38

** All flow rates above are in cubic metres per second. **



STATION NO 0705

Sheet C

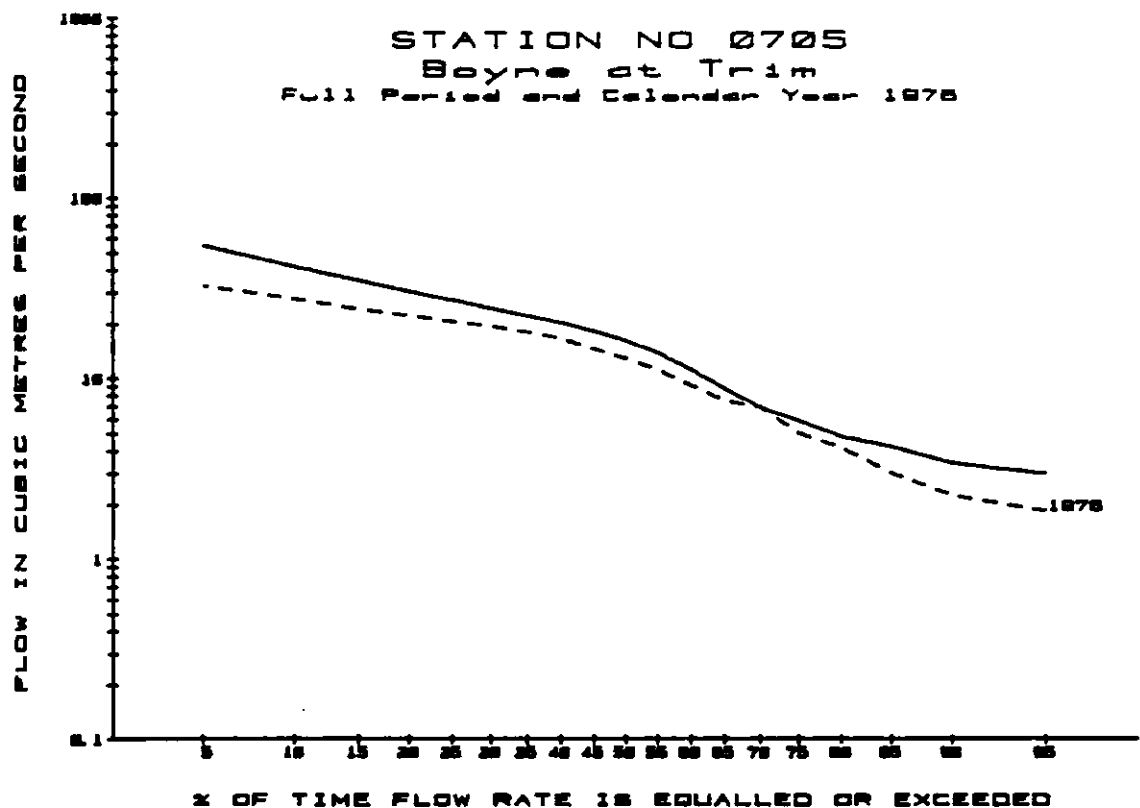
Boyne at Trim

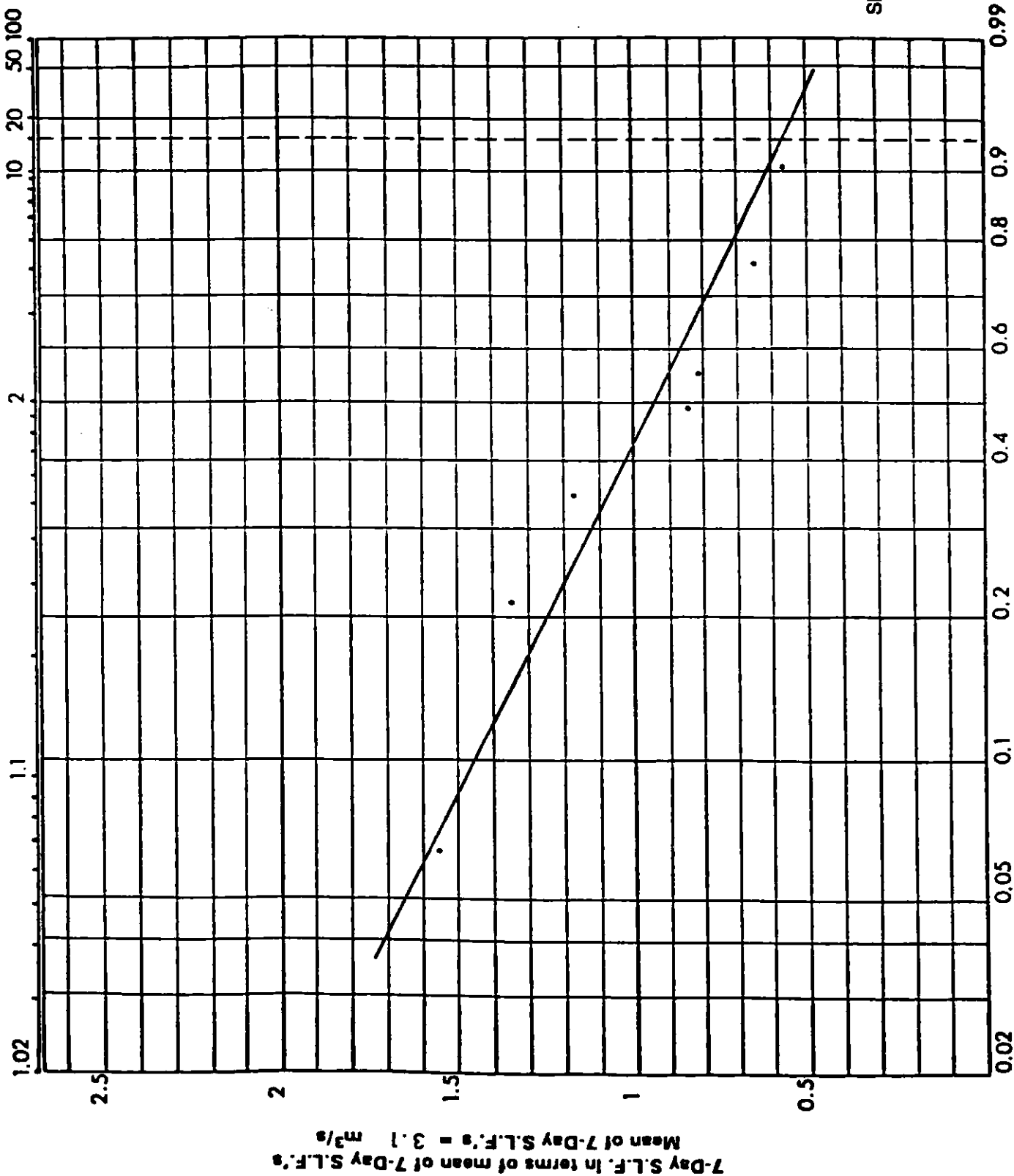
Data based on continuous water level records for the period :
28-Aug-75 to 31-Dec-81

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1976	1.790	1.800	1.88	2.24	
1975-1981	1.790	1.800	1.88	2.24	[Min]

TABLE OF EXCEEDANCE PERCENTILES					
Year 1976 Only					
5%	32.90	30%	19.80	75%	5.05
10%	27.90	40%	16.90	80%	4.19
15%	24.60	50%	13.10	85%	3.04
20%	22.70	60%	9.30	90%	2.30
25%	21.00	70%	7.04	95%	1.88

** All flow rates above are in cubic metres per second. **





Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0705
R. BOYNE AT TRIM
for period 1975 to 1981

EVI (Gumbel) Distribution - Probability of Exceedance

STATION NO 0706

Sheet A

Moynalty at Fyanstown

Body Responsible: OPW

N. G. R.: N 790 757

Catchment Area to Station: 179.0 sq km
Long Average Rainfall [1941-1970]: 980 mm/yr

Data based on continuous water level records for the period :
1-Jan-57 to 31-Dec-80

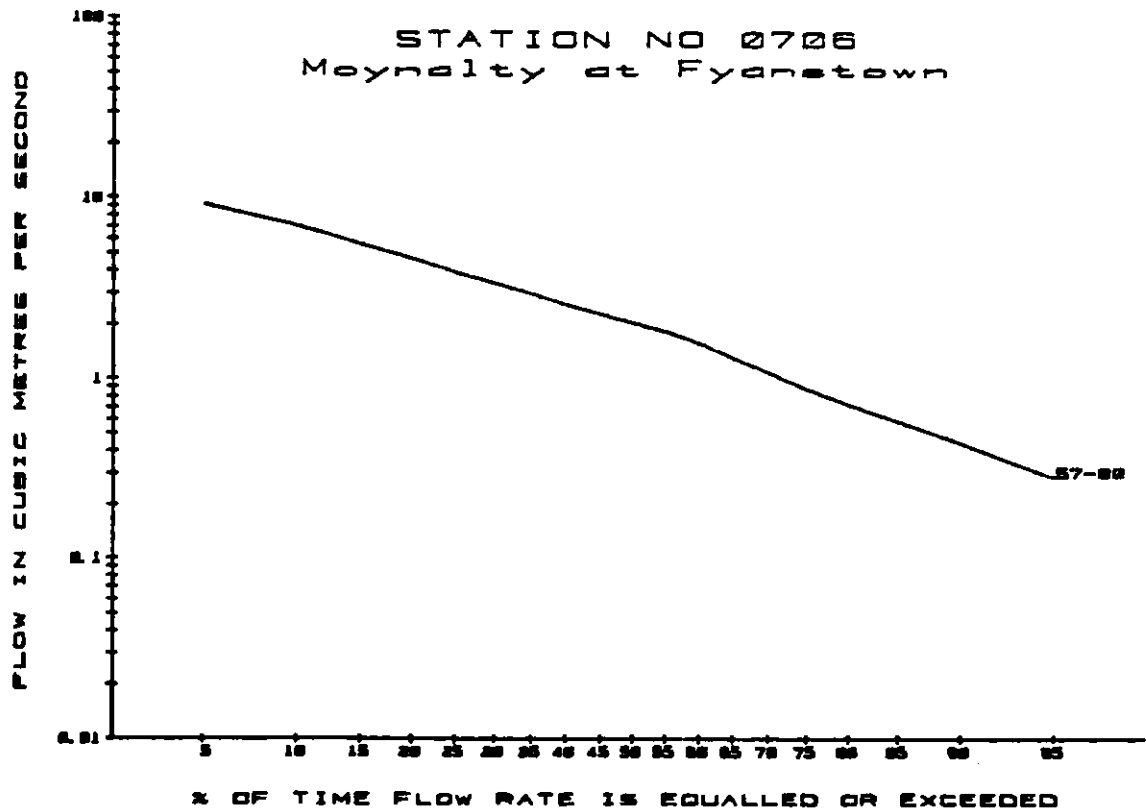
Mean Flow Rate: 2.95 [520 mm/yr rainfall on catchment]

Daily Mean Flows: minimum 0.085 on 20-Sep-59
maximum 22.20 on 10-Jan-68

TABLE OF EXCEEDANCE PERCENTILES

		Full period			
5%	9.07	30%	3.44	75%	0.80
10%	6.89	40%	2.64	80%	0.64
15%	5.59	50%	2.03	85%	0.52
20%	4.66	60%	1.51	90%	0.39
25%	3.95	70%	0.99	95%	0.27

** All flow rates above are in cubic metres per second. **



Data for 1981 for
Station No. 0706 FYANSTOWN
is not available

STATION NO 0706

Sheet C

Moynalty at Fyanstown

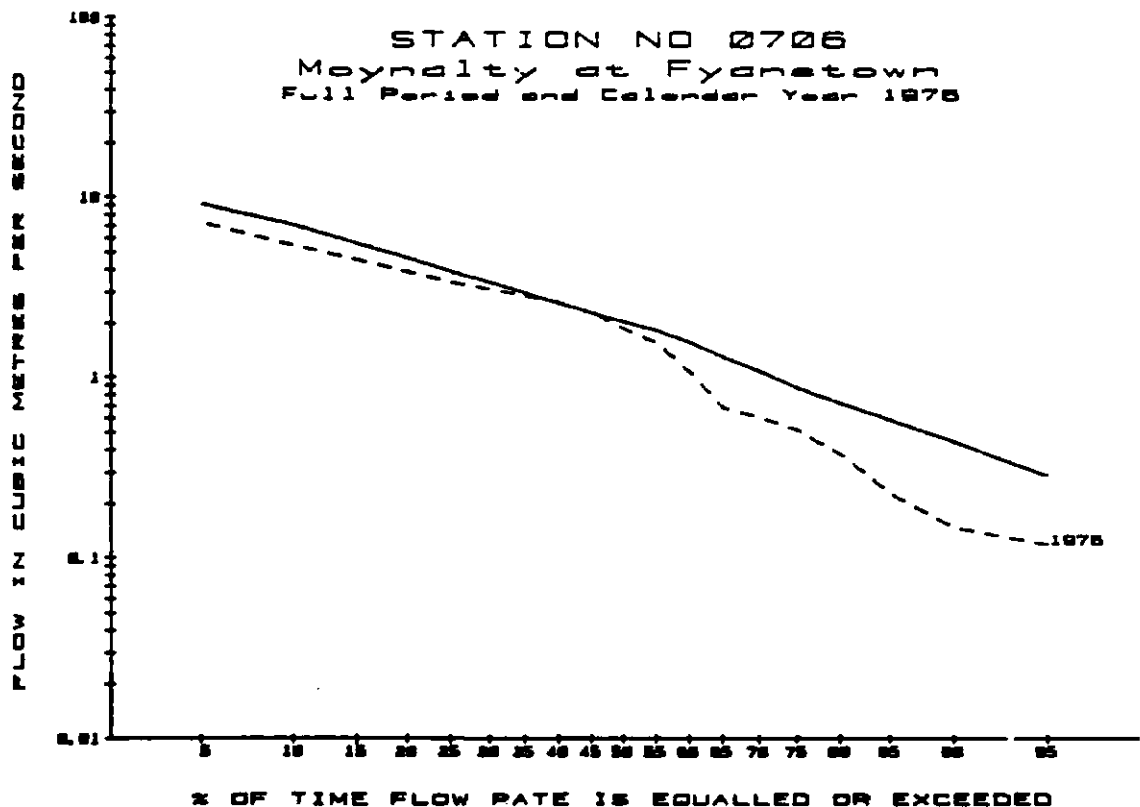
Data based on continuous water level records for the period :
1-Jan-57 to 31-Dec-80

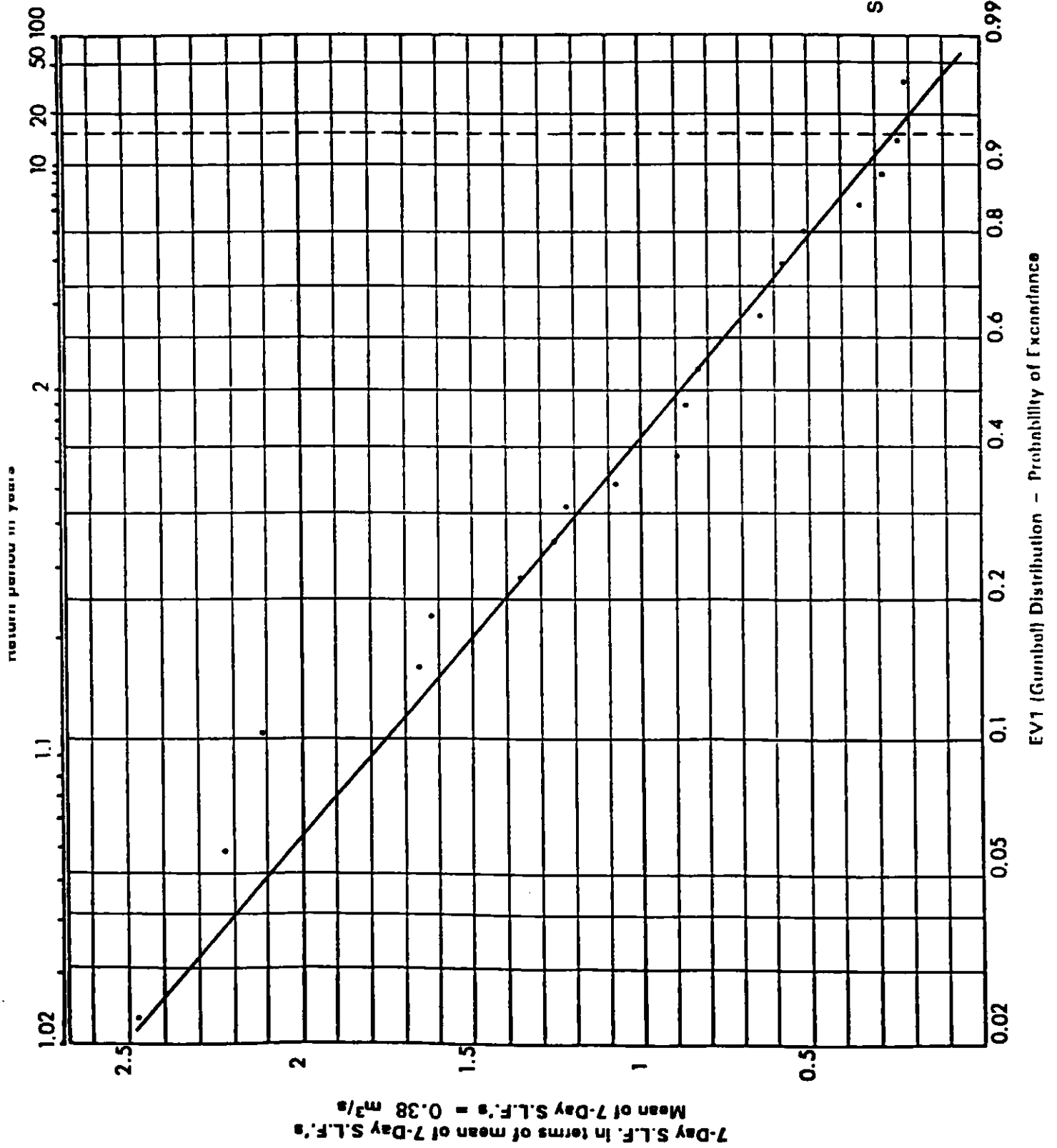
PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1976	0.090	0.110	0.13	0.14	
1957-1980	0.080	0.080	0.08	0.13	[Min]

TABLE OF EXCEEDANCE PERCENTILES

Year 1976 Only					
5%	7.28	30%	3.13	75%	0.52
10%	5.42	40%	2.64	80%	0.38
15%	4.53	50%	1.89	85%	0.23
20%	3.90	60%	1.09	90%	0.15
25%	3.42	70%	0.61	95%	0.12

** All flow rates above are in cubic metres per second. **





Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0706
R. MOYNALTY AT FYANSTOWN
for period 1957 to 1980

STATION NO 0709

Sheet A

Boyne at Navan Weir

Body Responsible: OPW

N. G. R.: N 878 667

Catchment Area to Station: 1610.0 sq km
Long Average Rainfall [1941-1970]: 898 mm/yr

Data based on continuous water level records for the period :
1-Jan-77 to 31-Dec-87

Mean Flow Rate: 25.24 [494 mm/yr rainfall on catchment]

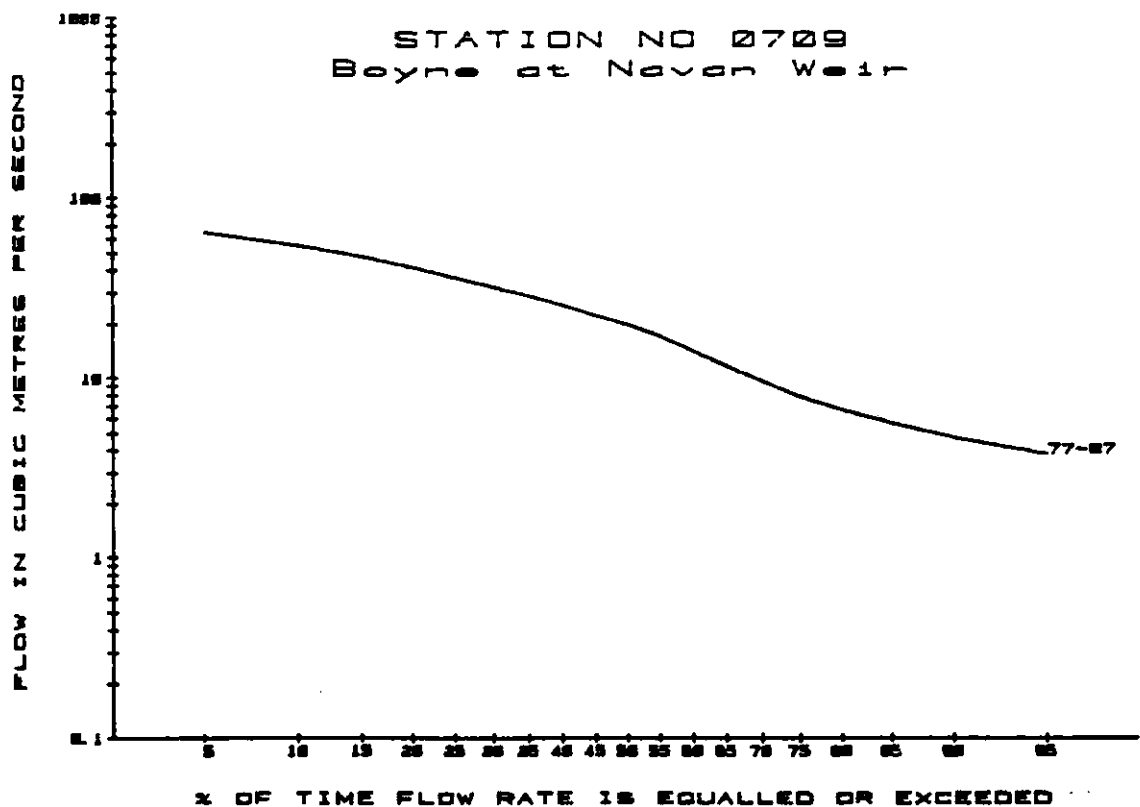
Daily Mean Flows: minimum 2.477 on 30-Jul-84
maximum 226.40 on 28-Dec-78

TABLE OF EXCEEDANCE PERCENTILES

		Full period			
5%	64.76	30%	32.13	75%	7.99
10%	54.61	40%	25.61	80%	6.74
15%	47.52	50%	19.98	85%	5.71
20%	41.26	60%	14.21	90%	4.77
25%	36.21	70%	9.69	95%	3.85

** Note: Lowest Measured Flow 1.64 on 11-Sept-59. **

** All flow rates above are in cubic metres per second. **



STATION NO 0709

Sheet B

Boyne at Navan Weir

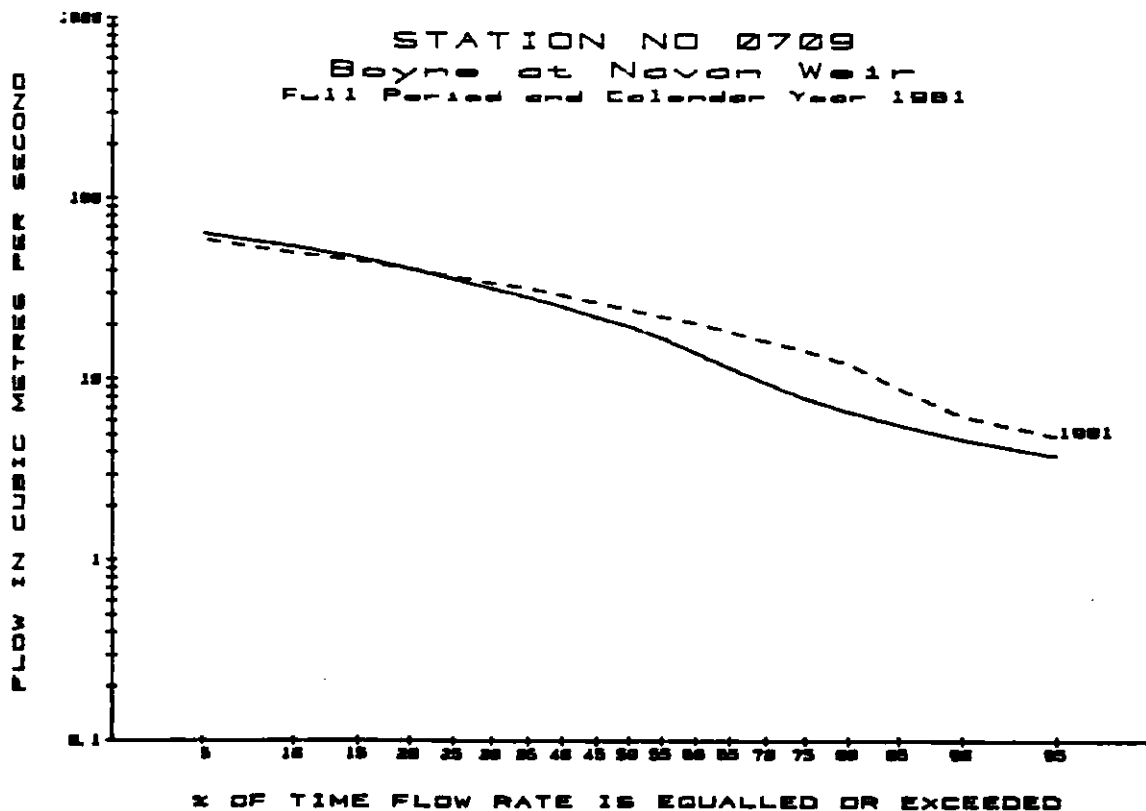
Data based on continuous water level records for the period :
1-Jan-77 to 31-Dec-87

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	4.273	4.560	4.83	5.52	
1977-1987	4.457	4.689	5.17	6.29	[Average]

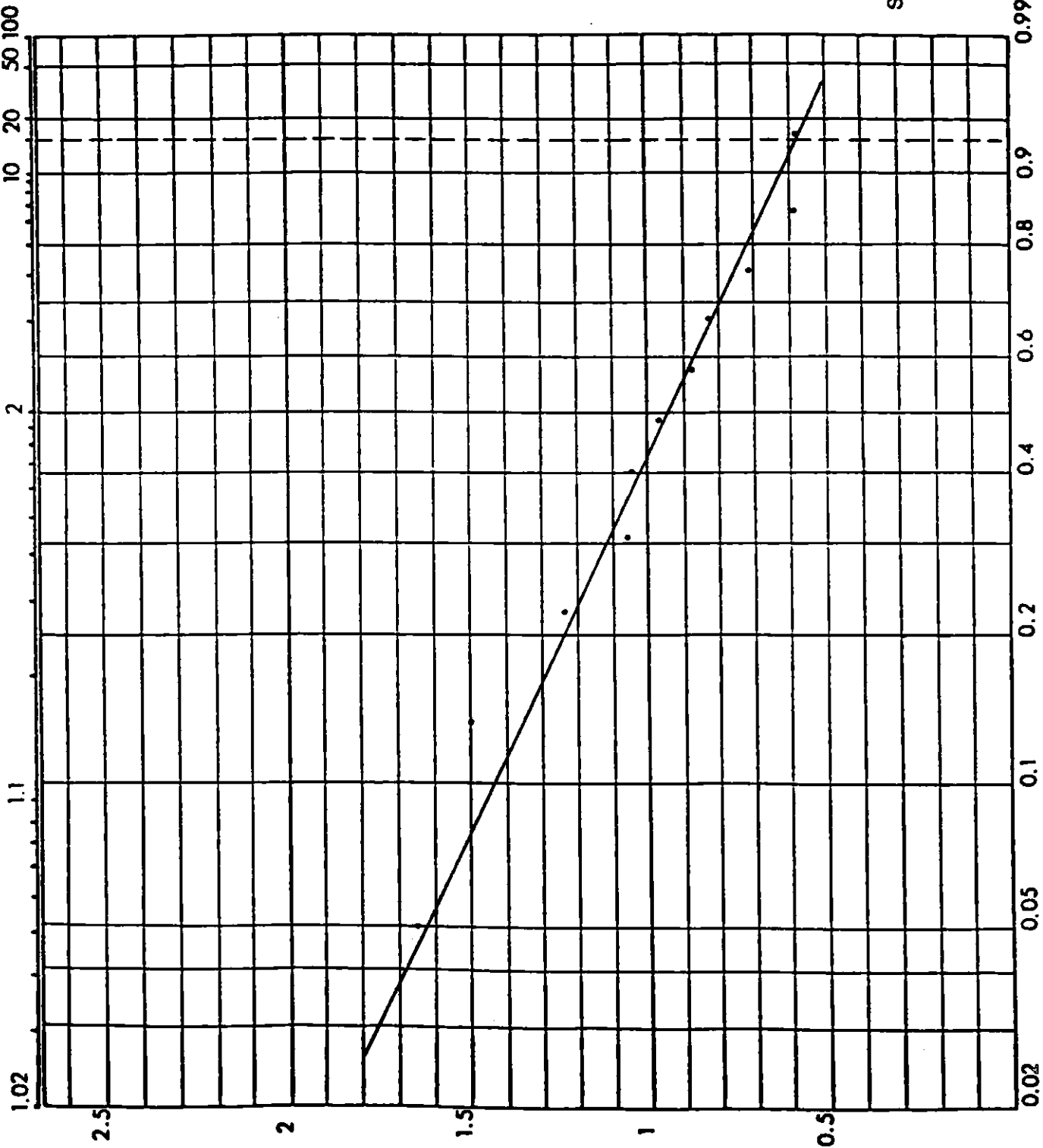
TABLE OF EXCEEDANCE PERCENTILES

Year 1981 Only					
5%	59.81	30%	34.44	75%	14.64
10%	50.31	40%	29.61	80%	12.35
15%	45.47	50%	24.68	85%	9.07
20%	41.14	60%	20.76	90%	6.41
25%	37.34	70%	16.49	95%	4.94

** All flow rates above are in cubic metres per second. **



Data for 1976 for
Station No. 0709 NAVAN WEIR
is not available



Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0709
R. BOYNE AT NAVAN WEIR
for period 1977 to 1987

EV1 (Gumbell) Distribution - Probability of Exceedance

STATION NO 0712

Sheet A

Boyne at Slane Castle

Body Responsible: OPW

N. G. R.: N 945 738

Catchment Area to Station: 2408.0 sq km
 Long Average Rainfall [1941-1970]: 920 mm/yr

Data based on continuous water level records for the period :
 1-Jan-74 to 31-Dec-87*

Mean Flow Rate: 38.79 [508 mm/yr rainfall on catchment]

Daily Mean Flows: minimum N.A.
 maximum 289.20 on 28-Dec-78

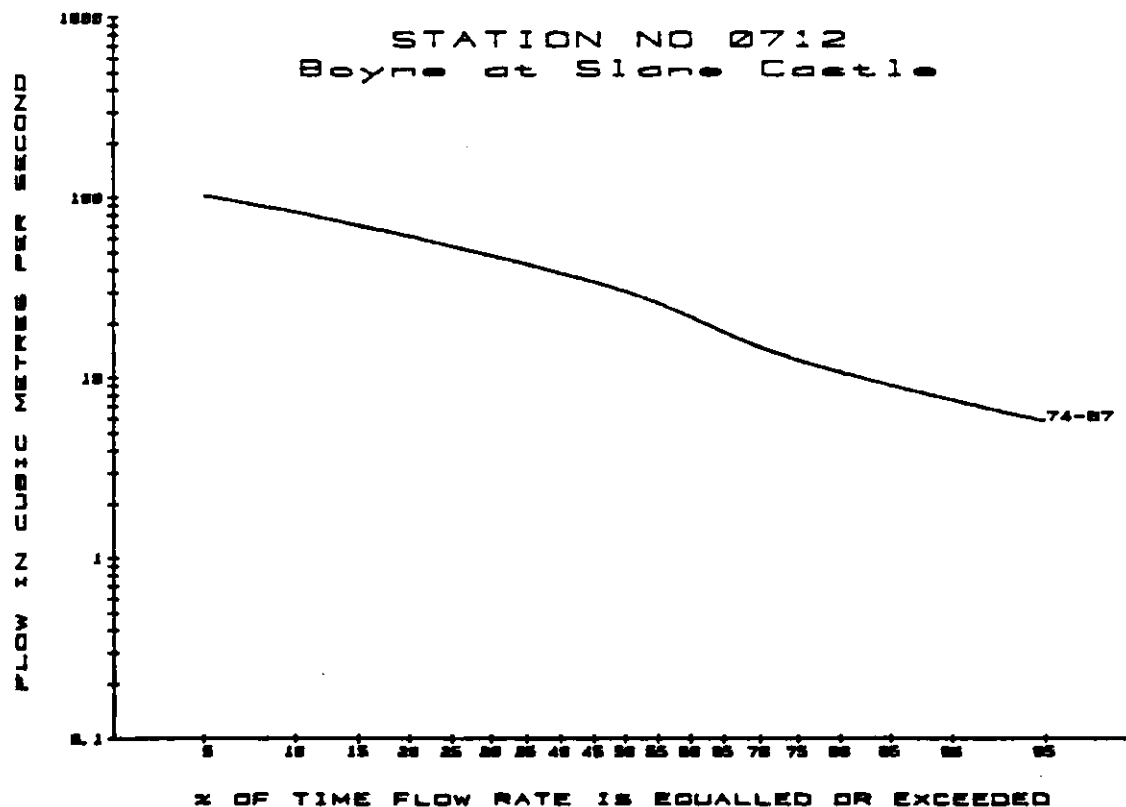
TABLE OF EXCEEDANCE PERCENTILES

FREE		EXERCISE		PERCENT	
		Full	period		
5%	104.00	30%	48.29	75%	12.66
10%	84.03	40%	38.54	80%	10.87
15%	70.51	50%	30.54	85%	9.21
20%	61.54	60%	22.07	90%	7.67
25%	54.22	70%	14.93	95%	5.85

** Note : Lowest Measured Flow 1.45 on 8-Sept-76 . **

** All flow rates above are in cubic metres per second. **

* excl. data for 1979 and 1983



STATION NO 0712

Sheet B

Boyne at Slane Castle

Data based on continuous water level records for the period :
1-Jan-74 to 31-Dec-87*

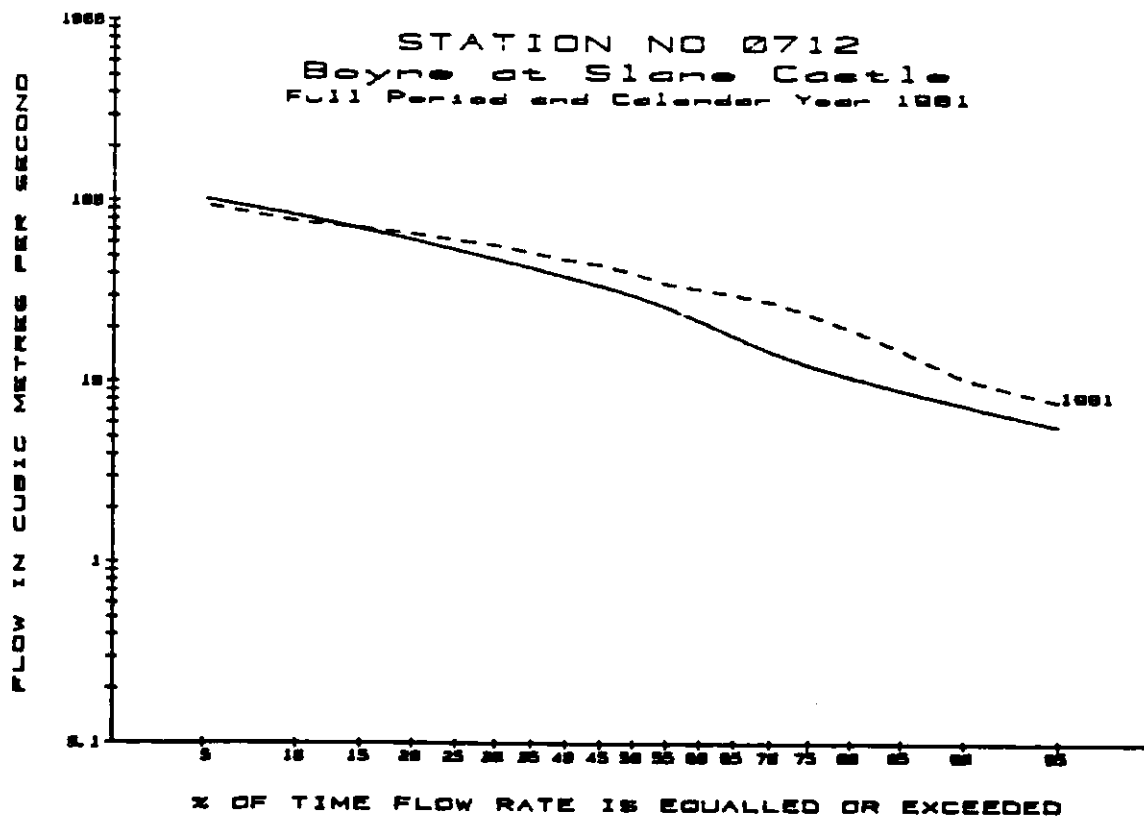
PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	6.512	7.047	7.66	9.20	
1974-1987	6.387	6.865	7.63	9.28	[Average]

TABLE OF EXCEEDANCE PERCENTILES

Year 1981 Only					
5%	96.37	30%	57.61	75%	24.14
10%	77.80	40%	48.11	80%	19.95
15%	71.53	50%	40.42	85%	15.29
20%	66.29	60%	33.11	90%	10.67
25%	61.65	70%	28.25	95%	7.97

** All flow rates above are in cubic metres per second. **

* excl. data for 1979 and 1983



STATION NO 0712

Sheet C

Boyne at Slane Castle

Data based on continuous water level records for the period :
1-Jan-74 to 31-Dec-87*

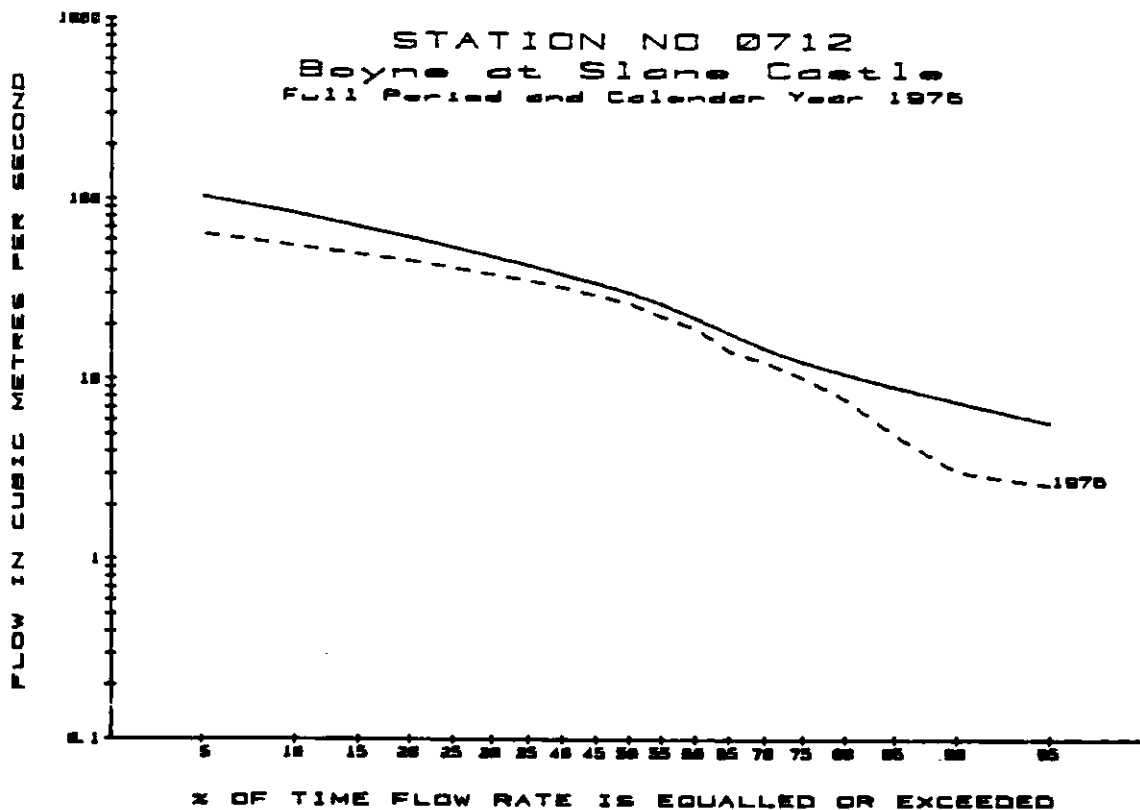
PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1976	1.874	2.274	2.62	2.82	
1974-1987	—	—	2.09	2.59	[Min]

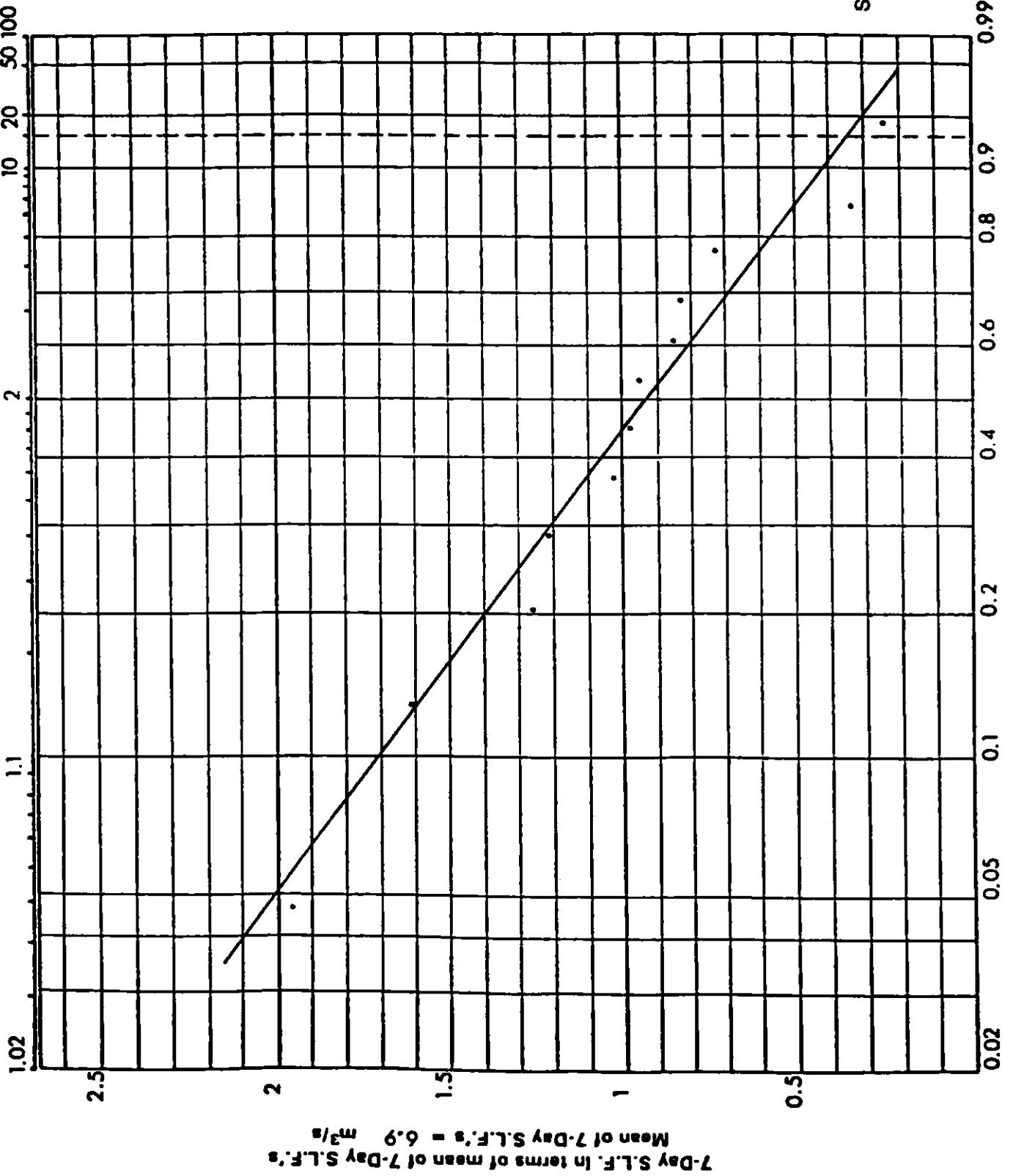
TABLE OF EXCEEDANCE PERCENTILES

Year 1976 Only					
5%	64.66	30%	38.44	75%	10.35
10%	55.36	40%	32.68	80%	7.86
15%	49.68	50%	26.69	85%	4.98
20%	45.67	60%	19.35	90%	3.14
25%	41.75	70%	12.57	95%	2.63

** All flow rates above are in cubic metres per second. **

* excl. data for 1979 and 1983





Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0712
R. BOYNE AT SLANE CASTLE
for period 1974 to 1987
(excl. data for 1979, 1983)

STATION NO 0717

Sheet A

Moynalty at Rosehill

Body Responsible: CAV

N.G.R.: N 720 852

Catchment Area to Station: 74.0 sq km
 Long Average Rainfall [1941-1970]: 1063 mm/yr

Data based on continuous water level records for the period :
 12-May-78 to 31-Dec-81

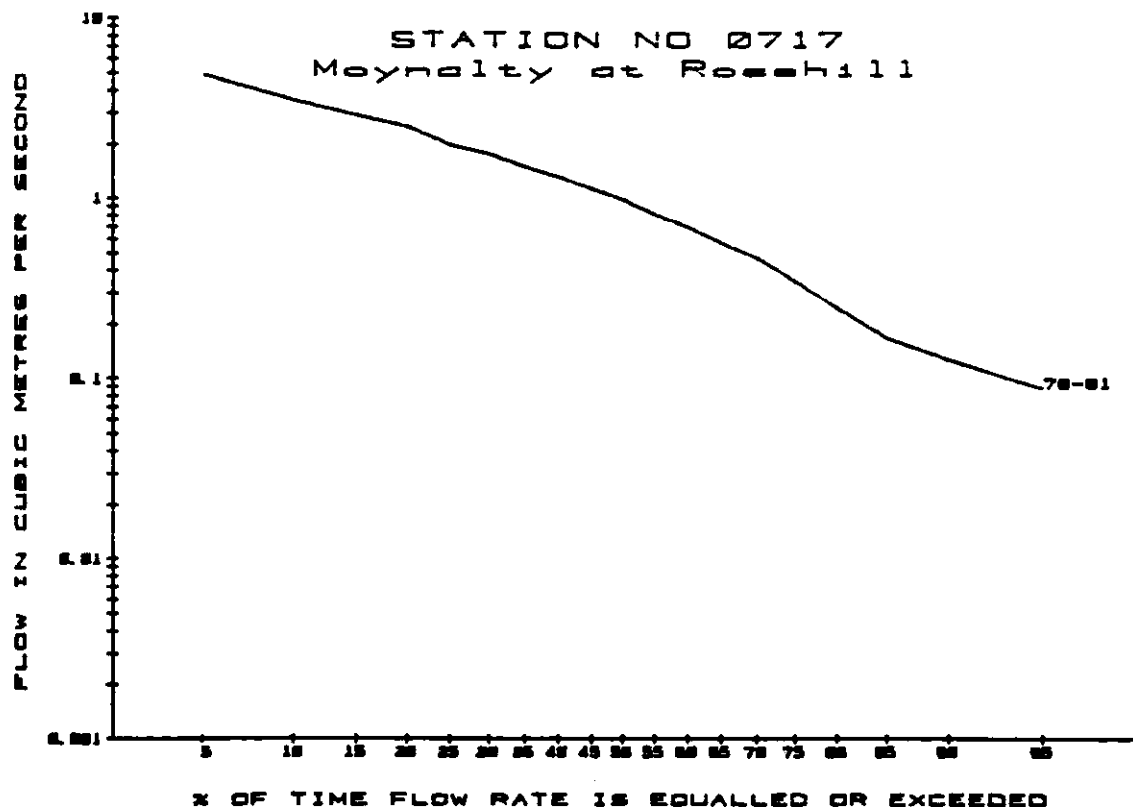
Mean Flow Rate: 1.53 [652 mm/yr rainfall on catchment]

Daily Mean Flows: minimum 0.040 on 17-Jul-80
 maximum 15.20 on 23-Oct-80

TABLE OF EXCEEDANCE PERCENTILES

Full period					
5%	4.90	30%	1.77	75%	0.35
10%	3.50	40%	1.32	80%	0.25
15%	2.90	50%	0.99	85%	0.17
20%	2.50	60%	0.70	90%	0.13
25%	1.98	70%	0.47	95%	0.09

** All flow rates above are in cubic metres per second. **



STATION NO 0717

Sheet B

Moynalty at Roseshill

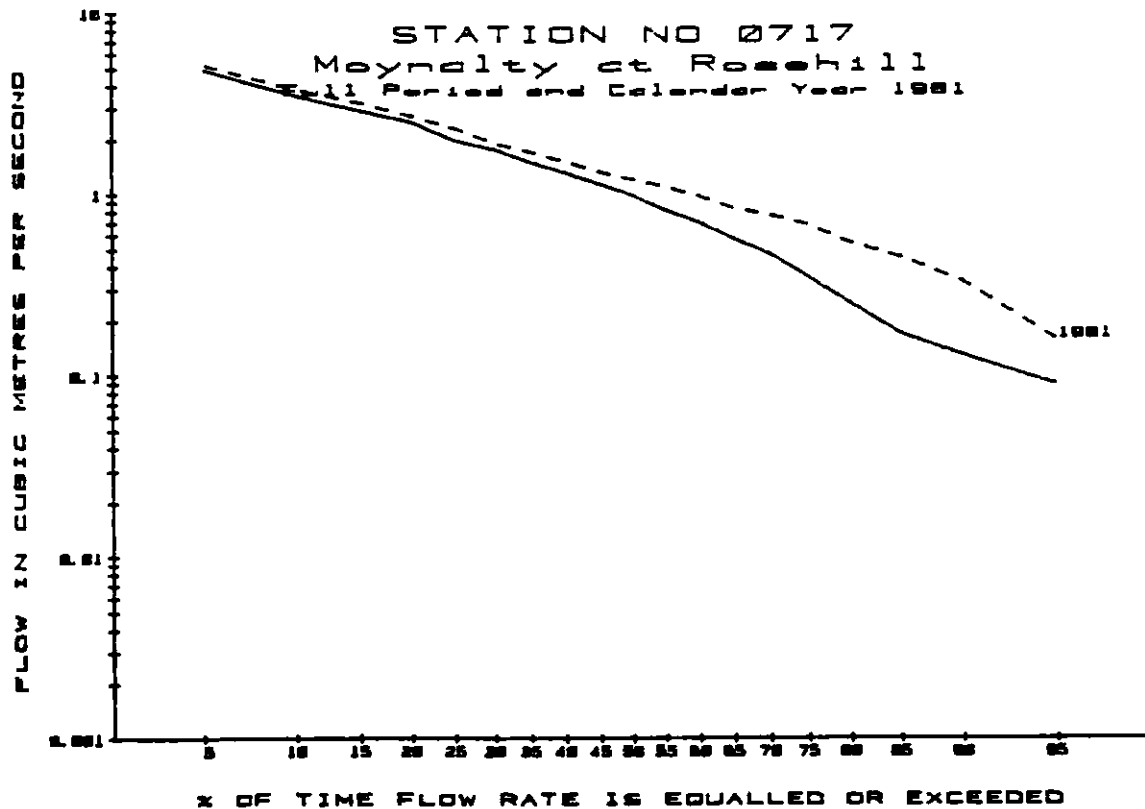
Data based on continuous water level records for the period :
12-May-78 to 31-Dec-81

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	0.125	0.138	0.16	0.32	
1978-1981	0.070	0.083	0.13	0.23	[Average]

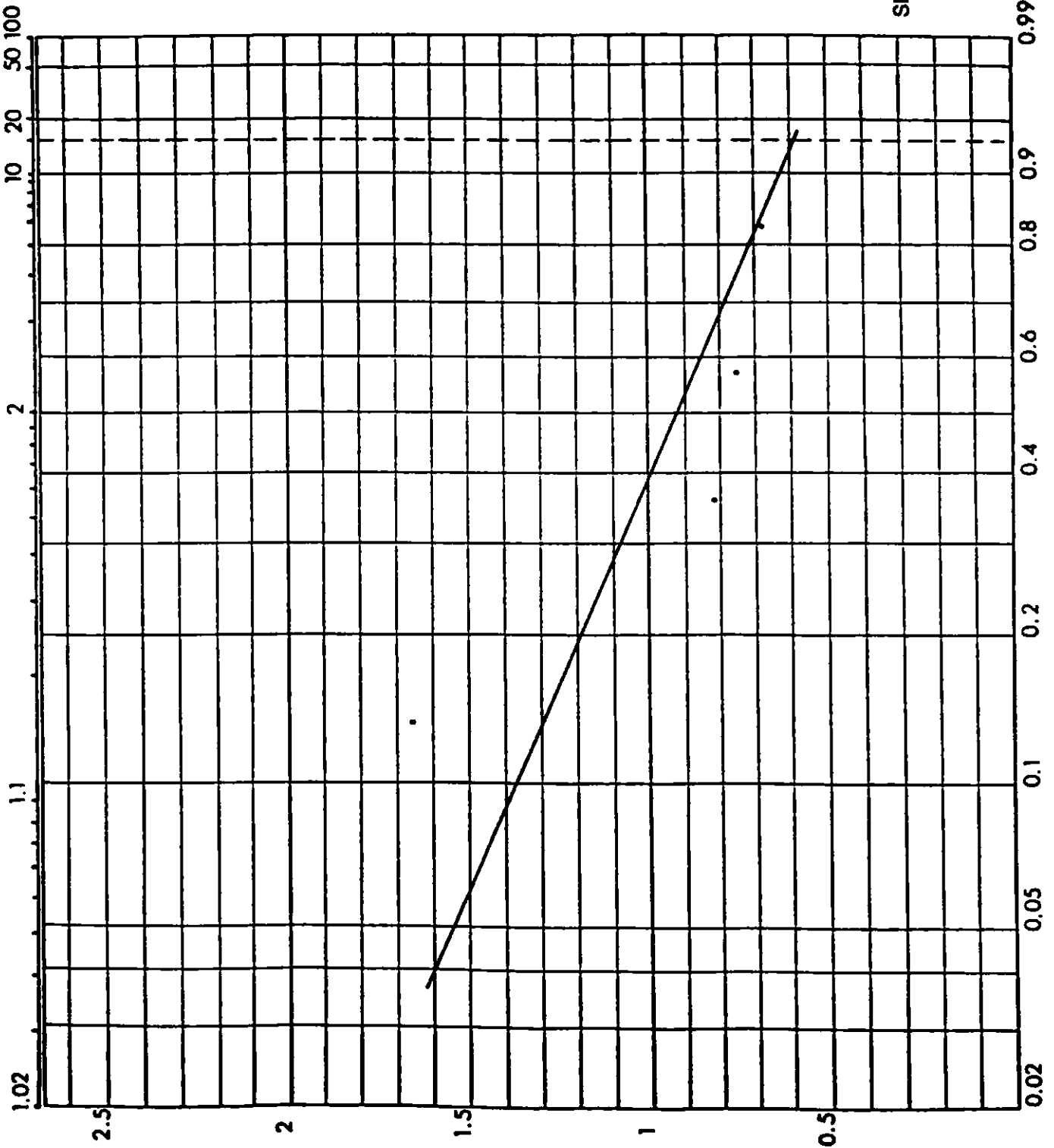
TABLE OF EXCEEDANCE PERCENTILES

Year 1981 Only					
5%	5.20	30%	1.91	75%	0.68
10%	3.80	40%	1.52	80%	0.54
15%	3.20	50%	1.21	85%	0.45
20%	2.70	60%	0.98	90%	0.33
25%	2.31	70%	0.77	95%	0.16

** All flow rates above are in cubic metres per second. **



Data for 1976 for
Station No. 0717 ROSEHILL
is not available



STATION NO 072

Sheet A

Skane at Drumree

Body Responsible: MEA

N. G. R.: N 943 S17

Catchment Area to Station: 3.9 sq km
 Long Average Rainfall [1941-1970]: 900 mm/yr

Data based on continuous water level records for the period:
 1-Jan-78 to 31-Dec-87

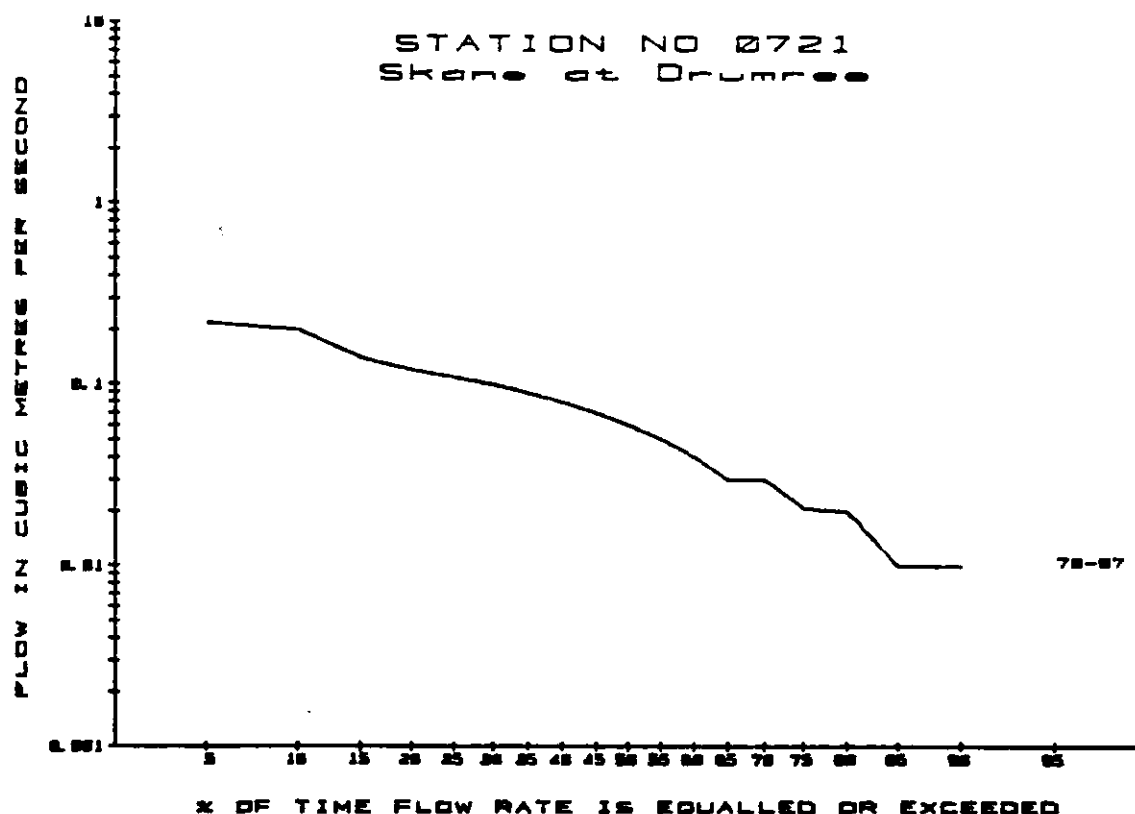
Mean Flow Rate: 0.09 [720 mm/yr rainfall on catchment]

Daily Mean Flows: minimum < 0.010 on 20-Aug-84
 maximum 3.30 on 21-Jan-80

TABLE OF EXCEEDANCE PERCENTILES

Full period					
5%	0.22	30%	0.10	75%	0.02
10%	0.20	40%	0.08	80%	0.02
15%	0.14	50%	0.06	85%	0.01
20%	0.12	60%	0.04	90%	0.01
25%	0.11	70%	0.03	95%	< 0.01

** All flow rates above are in cubic metres per second. **



STATION NO 0721

Sheet B

Skane at Drumree

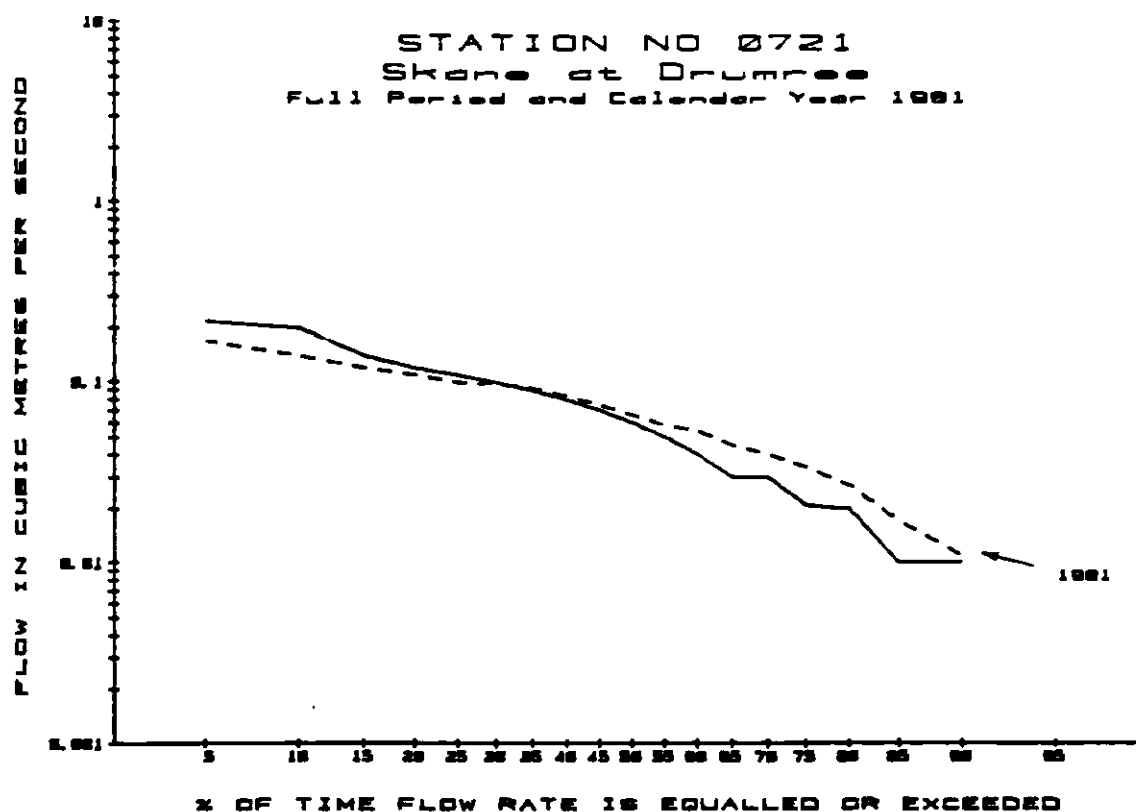
Data based on continuous water level records for the period :
1-Jan-78 to 31-Dec-87

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	<0.010	0.010	0.01	0.01	
1978-1987	0.010	0.010	0.01	0.02	[Average]

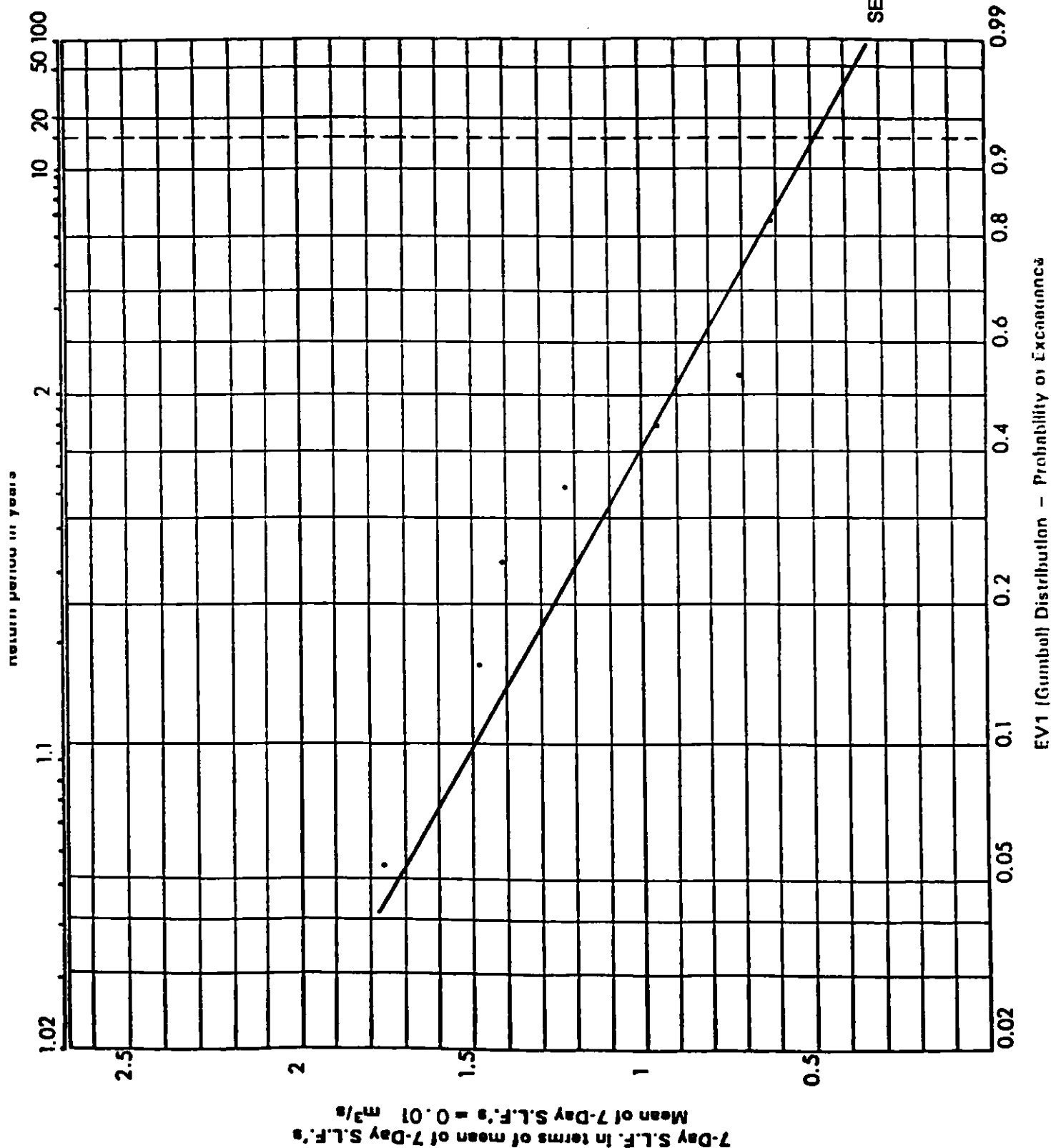
TABLE OF EXCEEDANCE PERCENTILES

Year 1981 Only					
5%	0.17	30%	0.10	75%	0.03
10%	0.14	40%	0.08	80%	0.03
15%	0.12	50%	0.07	85%	0.02
20%	0.11	60%	0.05	90%	0.01
25%	0.10	70%	0.04	95%	< 0.01

** All flow rates above are in cubic metres per second. **



Data for 1976 for
Station No. 0721 DRUMREE
is not available



STATION NO 0724

Sheet A

Clonmeath at Clonmeath

Body Responsible: MEA

N. G. R.: N 856 490

Catchment Area to Stations: 16.9 sq km
 Long Average Rainfall [1941-1970]: 850 mm/yr

Data based on continuous water level records for the period :
 1-Jan-78 to 31-Dec-83

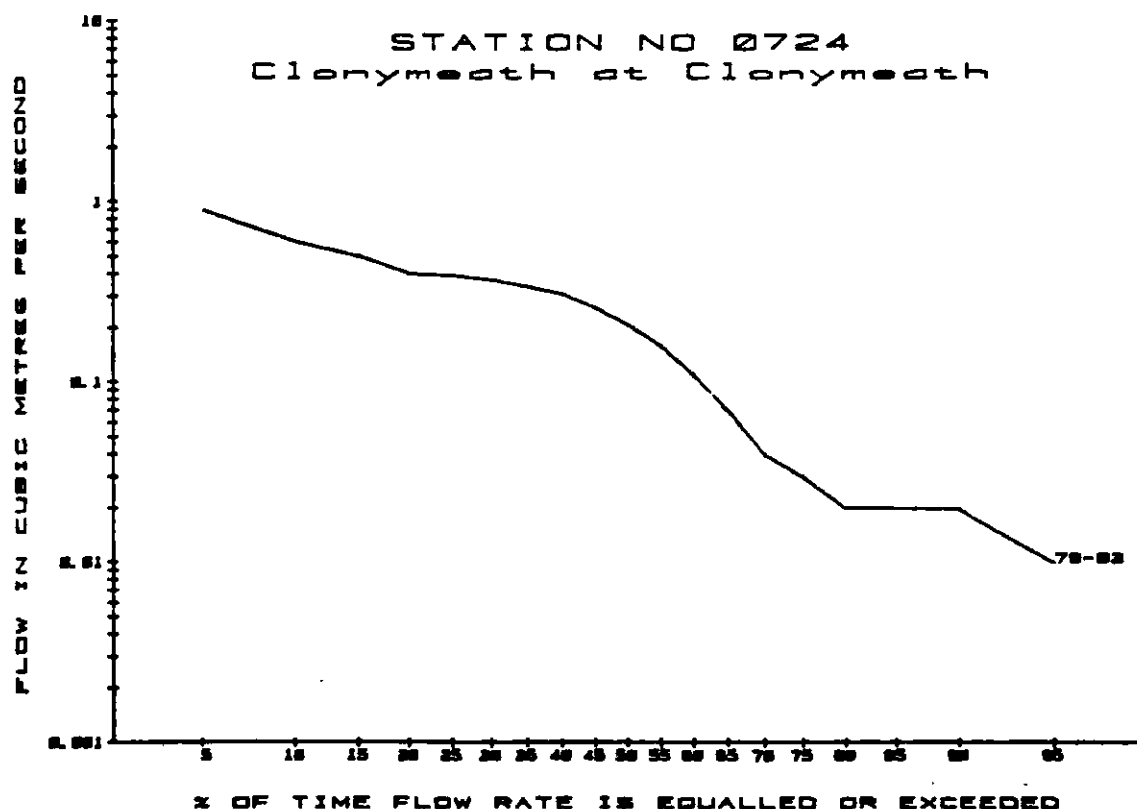
Mean Flow Rate: 0.29 [541 mm/yr rainfall on catchment]

Daily Mean Flows: minimum < 0.010 on 24-Sep-78
 maximum 3.50 on 28-Dec-78

TABLE OF EXCEEDANCE PERCENTILES

		Full period			
5%	0.90	30%	0.37	75%	0.03
10%	0.60	40%	0.31	80%	0.02
15%	0.50	50%	0.21	85%	0.02
20%	0.40	60%	0.11	90%	0.02
25%	0.39	70%	0.04	95%	0.01

** All flow rates above are in cubic metres per second. **



STATION NO 0724

Sheet B

Clonmeath at Clonmeath

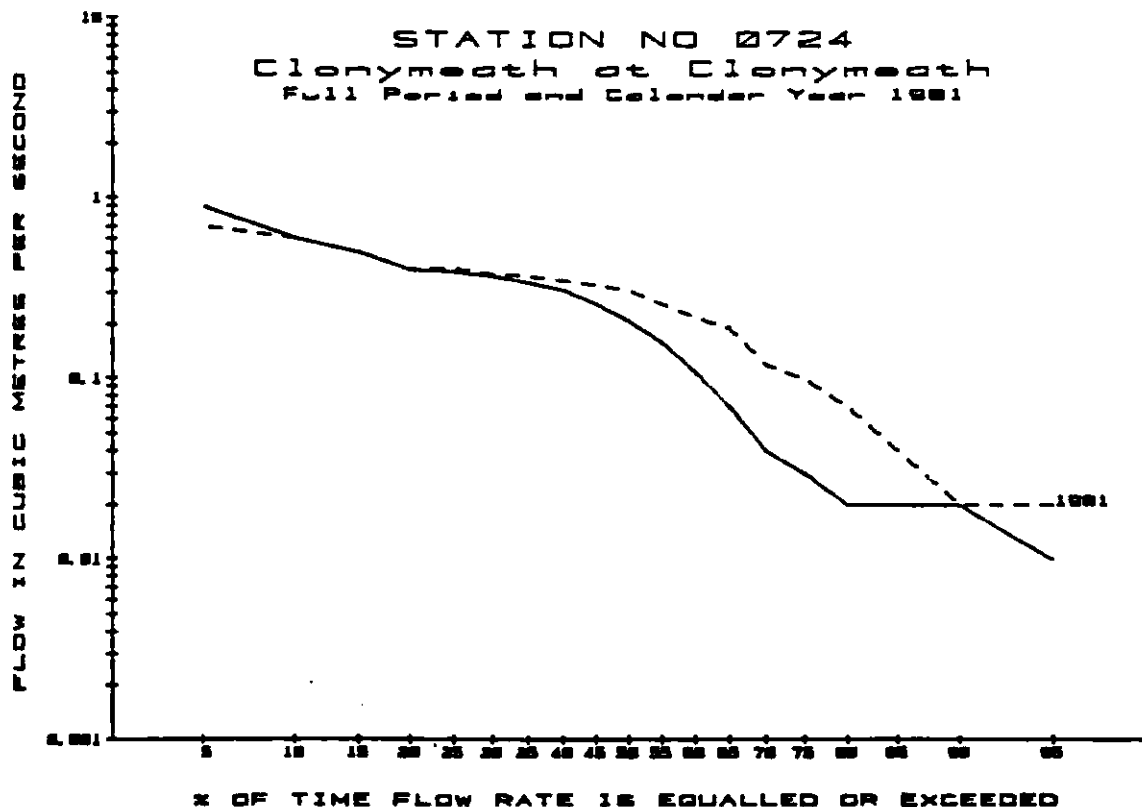
Data based on continuous water level records for the period :
1-Jan-78 to 31-Dec-83

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	0.016	0.020	0.02	0.02	
1978-1983	0.013	0.014	0.02	0.03	[Average]

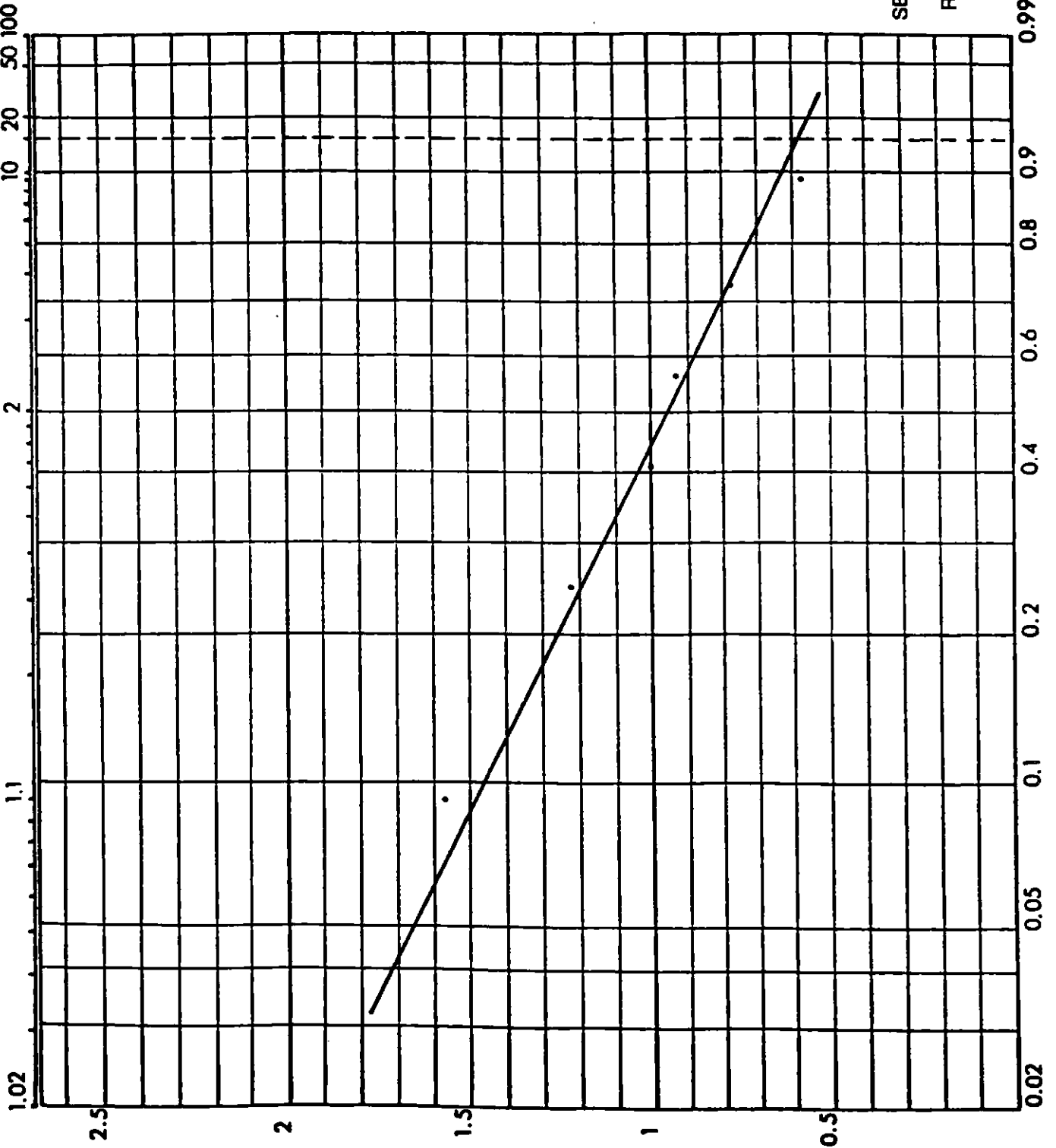
TABLE OF EXCEEDANCE PERCENTILES
Year 1981 Only

5%	0.70	30%	0.38	75%	0.10
10%	0.60	40%	0.35	80%	0.07
15%	0.50	50%	0.31	85%	0.04
20%	0.40	60%	0.22	90%	0.02
25%	0.41	70%	0.12	95%	0.02

** All flow rates above are in cubic metres per second. **



Data for 1976 for
Station No. 0724 CLONYMEATH
is not available



Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0724
R. CLONMEATH AT CLONMEATH
for period 1978 to 1983

EV1 (Gumbell) Distribution - Probability of Exceedance

STATION NO 0802

Sheet A

Delvin at Naul

Body Responsible: DUC

N. G. R.: 0 132 612

Catchment Area to Station: 37.0 sq km
 Long Average Rainfall [1941-1970]: 850 mm/yr

Data based on continuous water level records for the period :
 25-Mar-77 to 31-Dec-87*

Mean Flow Rate: 0.50 [426 mm/yr rainfall on catchment]

Daily Mean Flows: minimum 0.017 on 13-Aug-77
 maximum 10.30 on 27-Dec-78

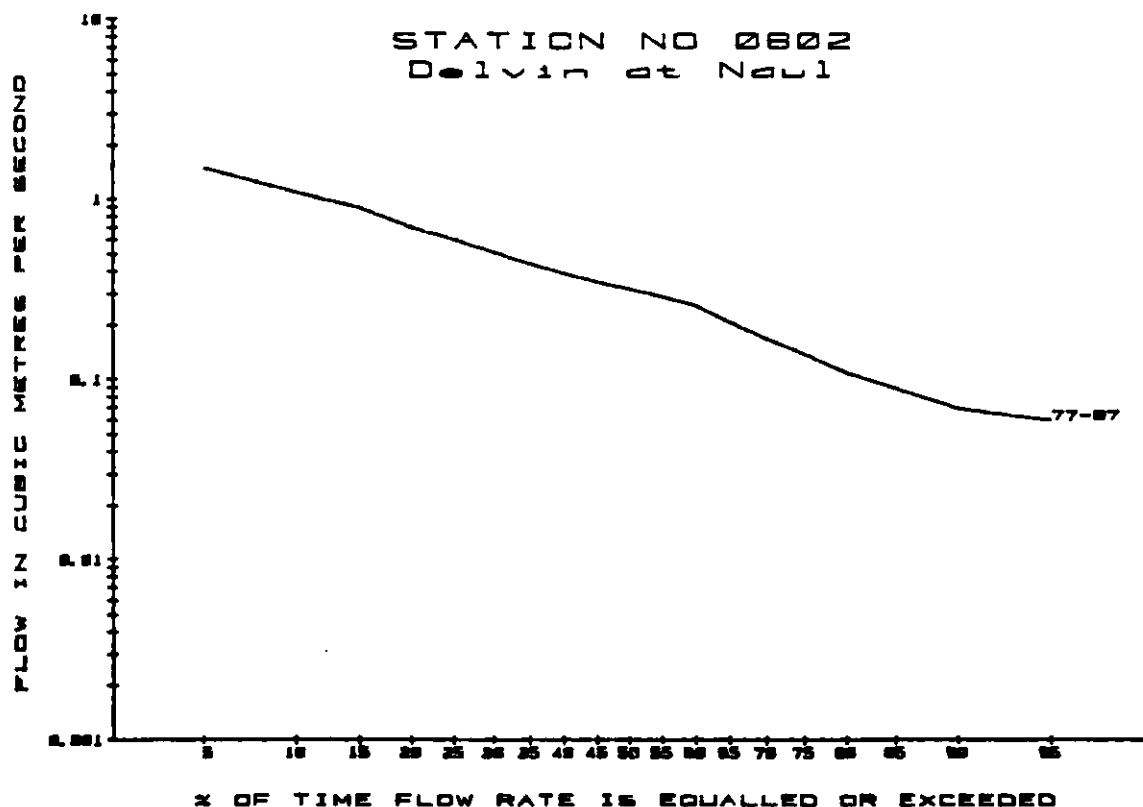
TABLE OF EXCEEDANCE PERCENTILES

		Full period			
5%	1.50	30%	0.51	75%	0.14
10%	1.10	40%	0.39	80%	0.11
15%	0.90	50%	0.32	85%	0.09
20%	0.70	60%	0.26	90%	0.07
25%	0.60	70%	0.17	95%	0.06

** Note : Lowest Measured Flow 0.03 on 25-Aug.-76. **

** All flow rates above are in cubic metres per second. **

* excl. data for 1978.



STATION NO 0802

Sheet B

Delvin at Naul

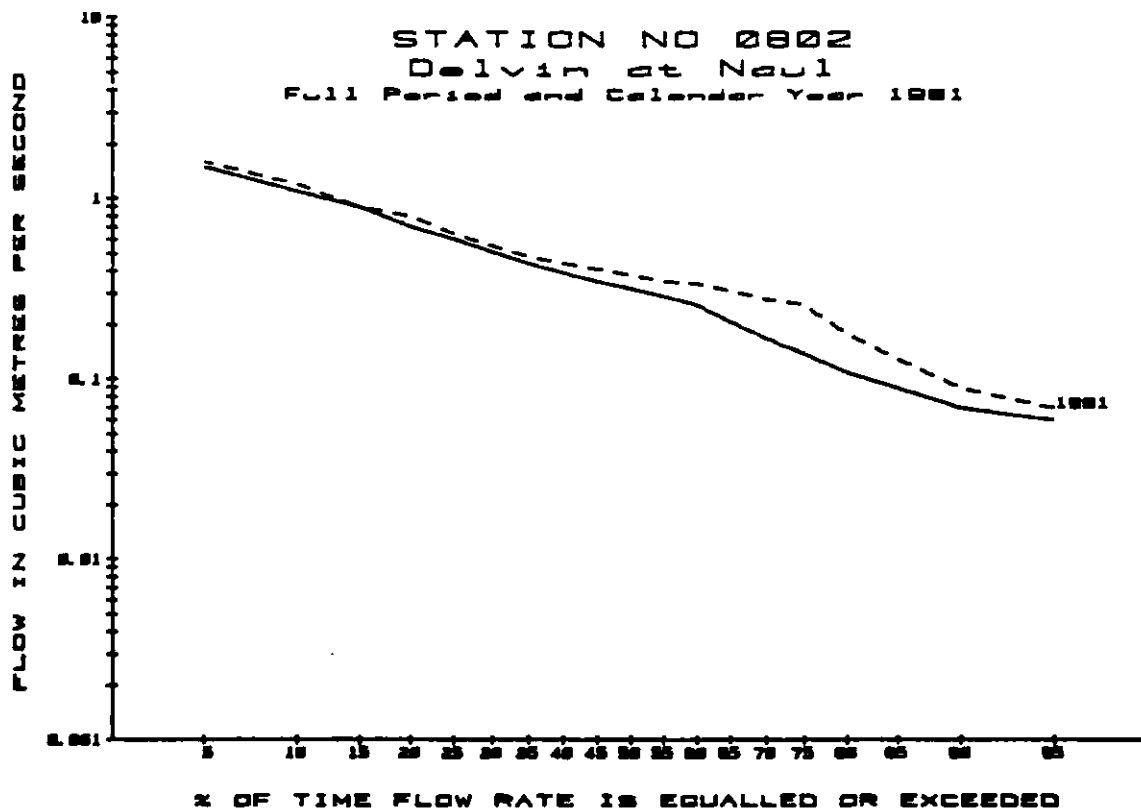
Data based on continuous water level records for the period :
25-Mar-77 to 31-Dec-87*

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	0.053	0.055	0.07	0.09	
1977-1987	0.062	0.068	0.09	0.17	[Average]

TABLE OF EXCEEDANCE PERCENTILES					
Year 1981 Only					
5%	1.60	30%	0.55	75%	0.26
10%	1.20	40%	0.44	80%	0.18
15%	0.90	50%	0.38	85%	0.13
20%	0.80	60%	0.34	90%	0.09
25%	0.64	70%	0.28	95%	0.07

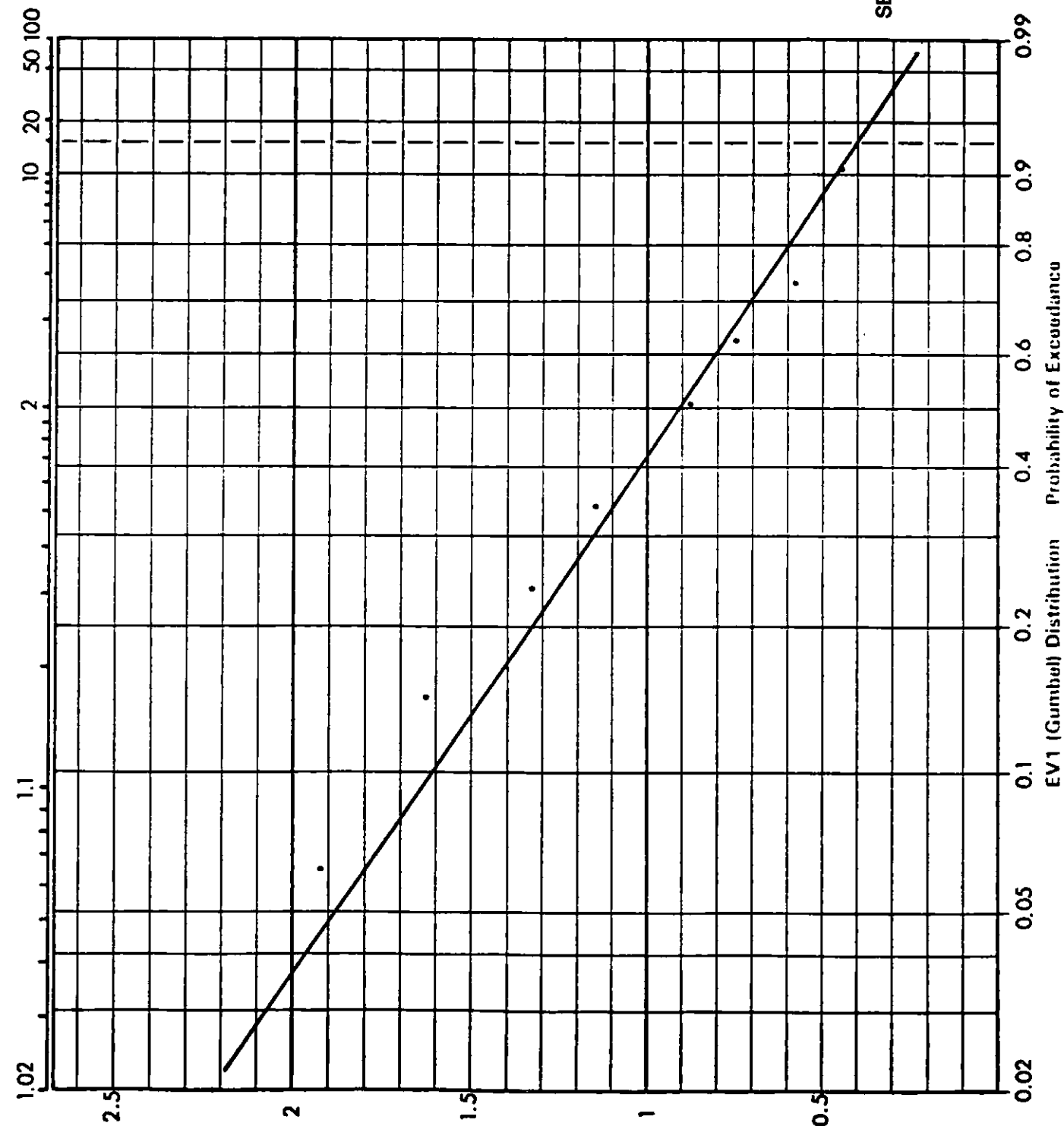
** All flow rates above are in cubic metres per second. **

* excl. data for 1978.



Data for 1976 for
Station No. 0802 NAUL
is not available

Return period in years



Sheet D

Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0802
R. DELVIN AT NAUL
for period 1977 to 1987
(excl. data for 1978)

STATION NO 0805

Sheet A

Sluice at Kinsaley Hall

Body Responsible: DUC

N.G.R.: 0 220 417

Catchment Area to Station: 10.1 sq km
 Long Average Rainfall [1941-1970]: 780 mm/yr

Data based on continuous water level records for the period :
 11-Mar-77 to 31-Dec-87

Mean Flow Rate: 0.15 [473 mm/yr rainfall on catchment]

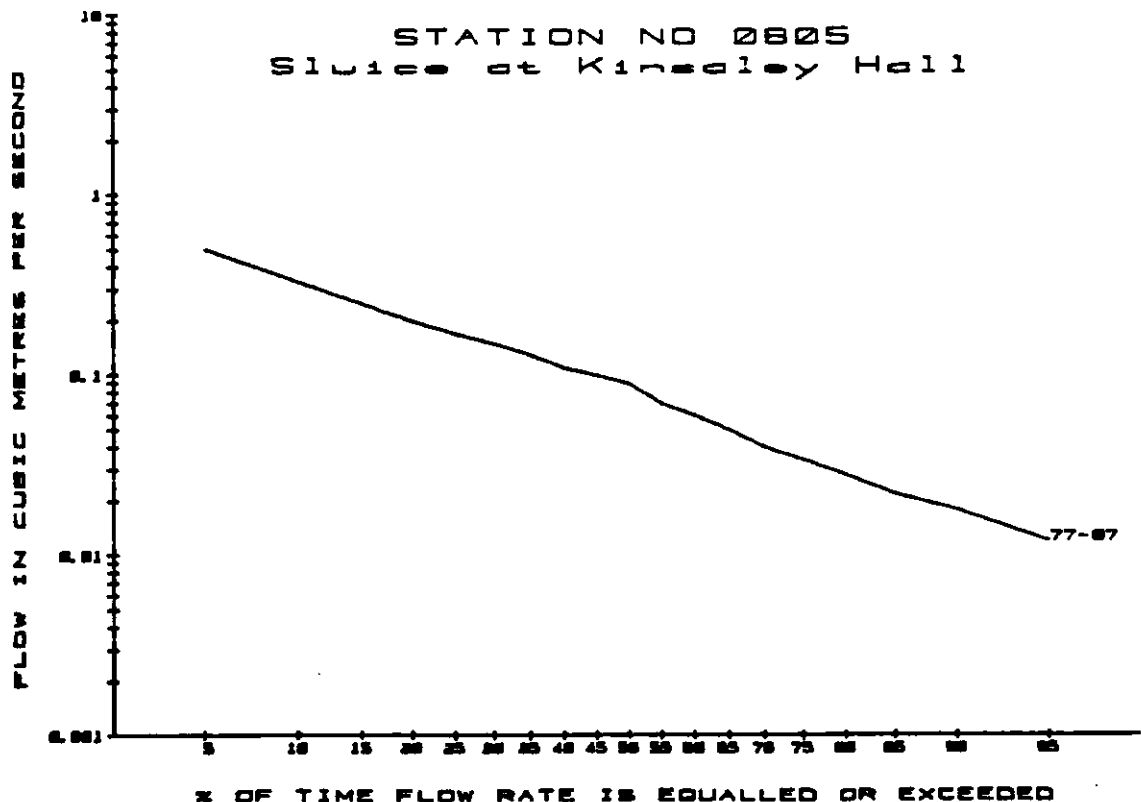
Daily Mean Flows: minimum < 0.010 on 21-Aug-77
 maximum 6.20 on 26-Aug-86

TABLE OF EXCEEDANCE PERCENTILES

		Full period			
5%	0.50	30%	0.15	75%	0.03
10%	0.33	40%	0.11	80%	0.03
15%	0.25	50%	0.09	85%	0.02
20%	0.20	60%	0.06	90%	0.02
25%	0.17	70%	0.04	95%	0.01

** Note : Lowest Measured Flow 0.003 on 24-Aug-76 , 8-Sept-81 . **

** All flow rates above are in cubic metres per second. **



STATION NO 0805

Sheet B

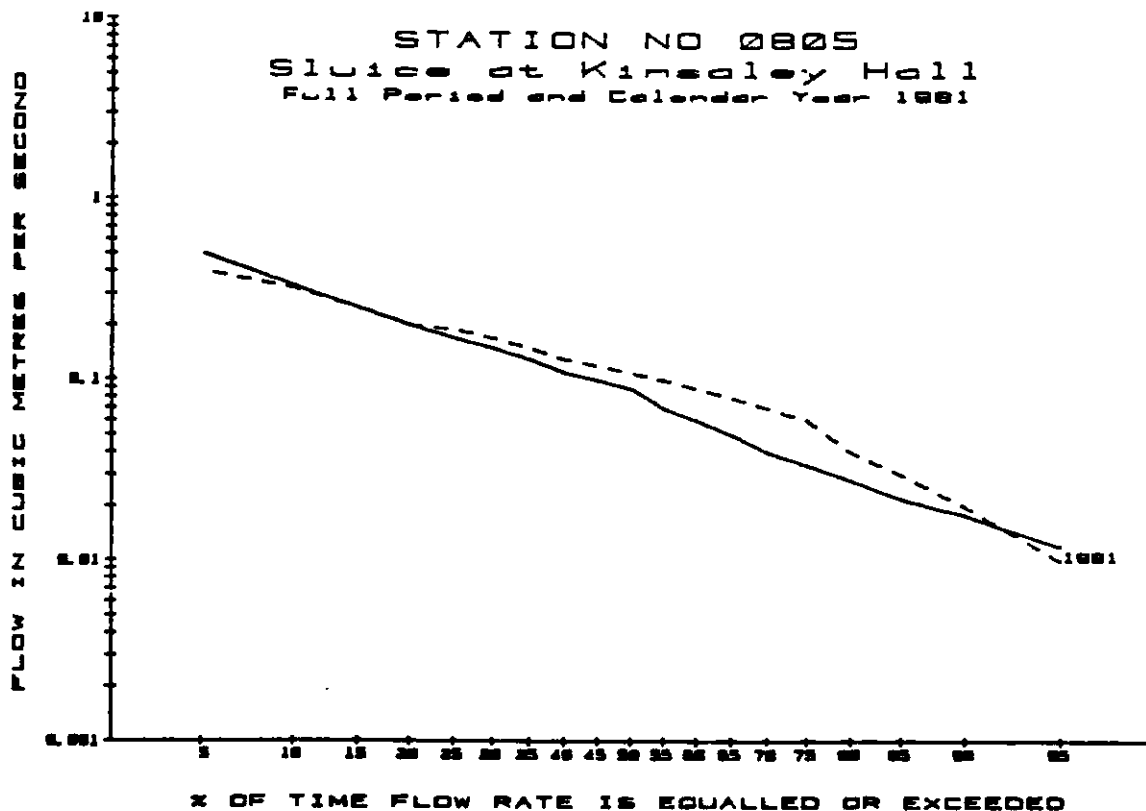
Sluice at Kinsaley Hall

Data based on continuous water level records for the period :
11-Mar-77 to 31-Dec-87

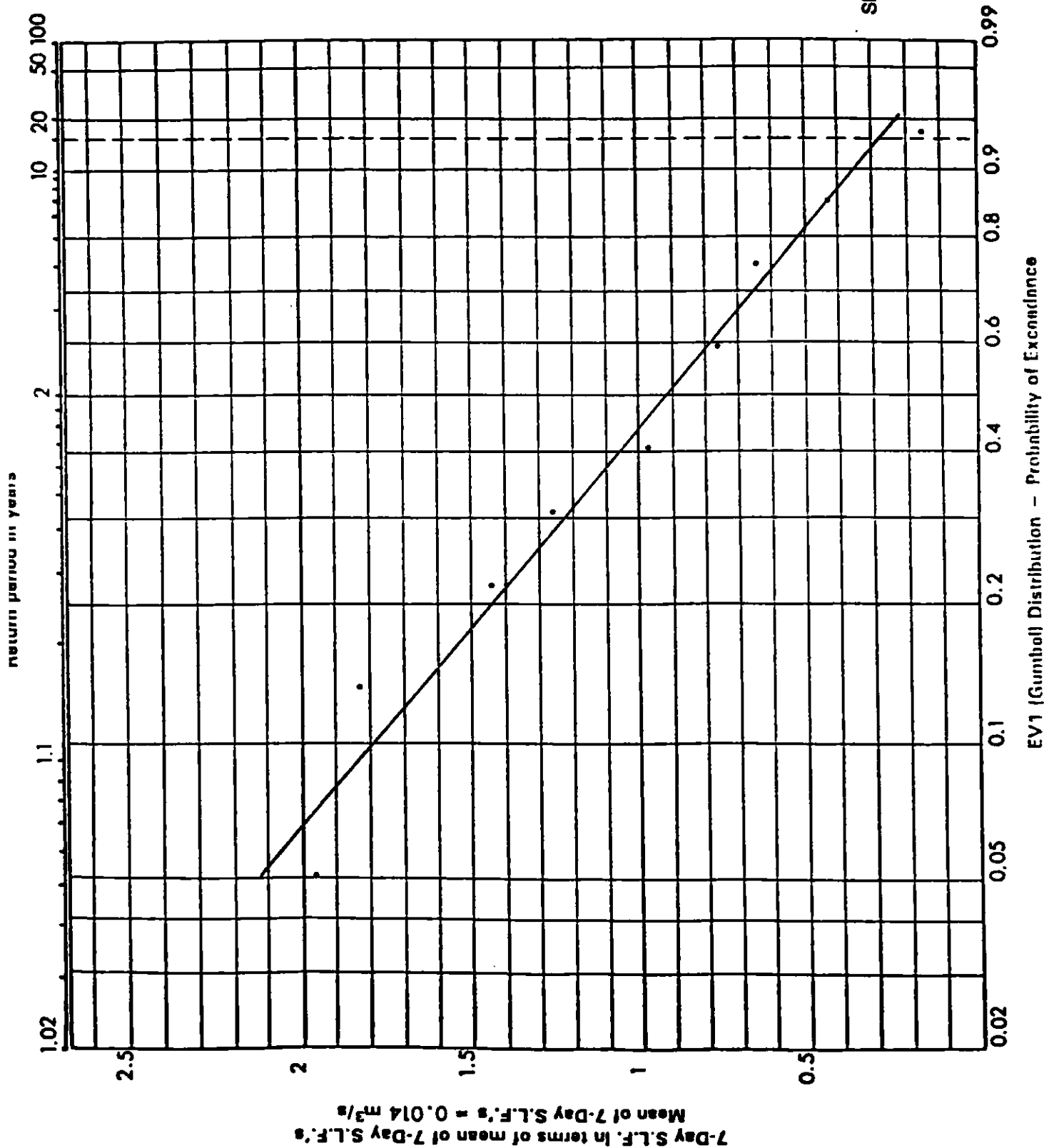
PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	<0.010	<0.010	0.10	0.03	
1977-1987	0.011	0.014	0.02	0.05	[Average]

TABLE OF EXCEEDANCE PERCENTILES					
Year 1981 Only					
5%	0.40	30%	0.17	75%	0.06
10%	0.32	40%	0.13	80%	0.04
15%	0.25	50%	0.11	85%	0.03
20%	0.20	60%	0.09	90%	0.02
25%	0.19	70%	0.07	95%	0.01

** All flow rates above are in cubic metres per second. **



Data for 1976 for
Station No. 0805 KINSALEY HALL
is not available



Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0805
R. SLUICE AT KINSALEY HALL
for period 1977 to 1987

STATION NO 0806

Sheet A

Mayne at Hole In The Wall

Body Responsible: DUC

N.G.R.: 0 222 415

Catchment Area to Station: 15.9 sq km
Long Average Rainfall [1941-1970]: 780 mm/yr

Data based on continuous water level records for the period :
9-Mar-77 to 31-Dec-85

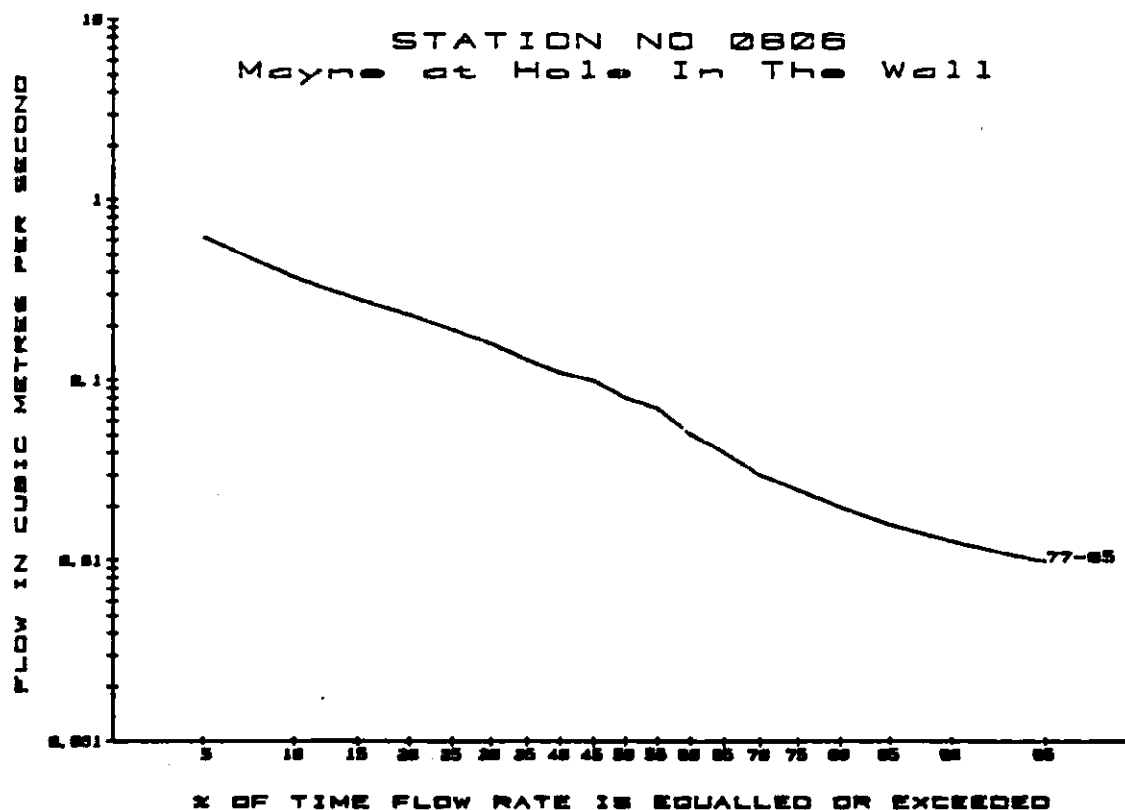
Mean Flow Rate: 0.16 [323 mm/yr rainfall on catchment]

Daily Mean Flows: minimum < 0.010 on 4-Sep-78
maximum 2.65 on 21-Jan-80

TABLE OF EXCEEDANCE PERCENTILES

Full period					
5%	0.62	30%	0.16	75%	0.03
10%	0.37	40%	0.11	80%	0.02
15%	0.28	50%	0.08	85%	0.02
20%	0.23	60%	0.05	90%	0.01
25%	0.19	70%	0.03	95%	0.01

** All flow rates above are in cubic metres per second. **



STATION NO 0806

Sheet B

Mayne at Hole in the Wall

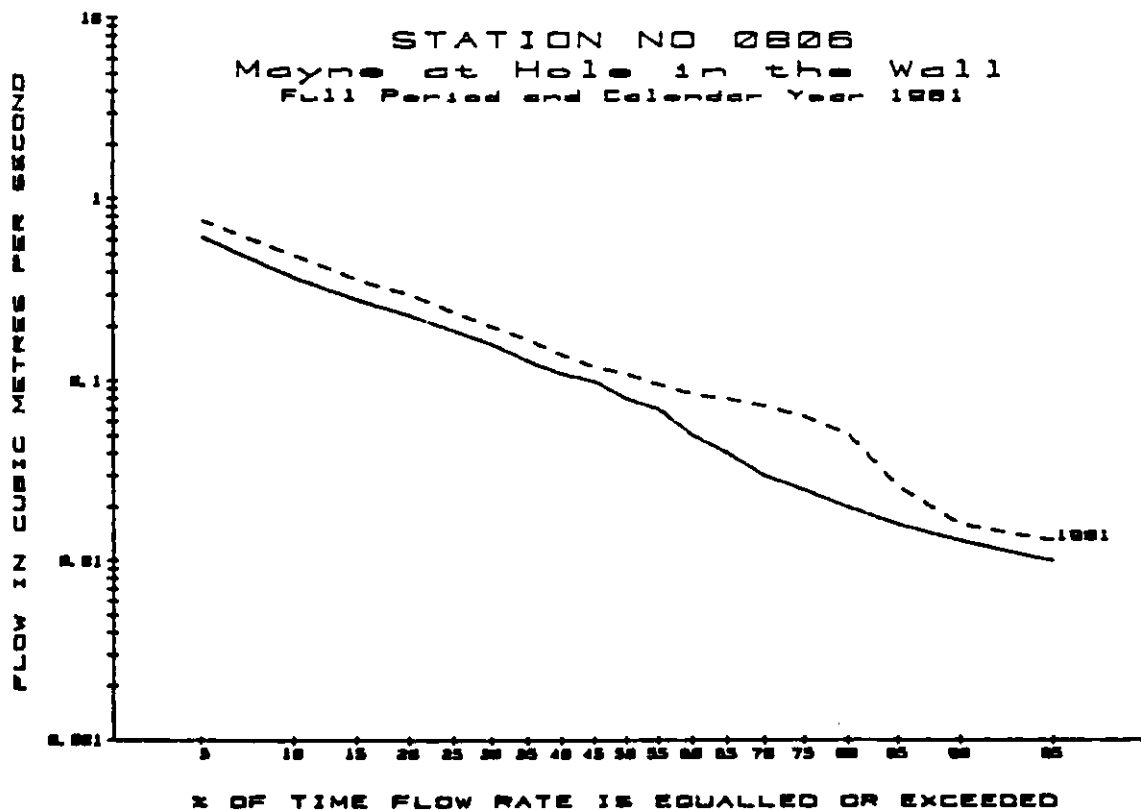
Data based on continuous water level records for the period :
9-Mar-77 to 31-Dec-85

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	0.010	0.011	0.01	0.03	
1977-1985	0.009	0.012	0.02	0.06	[Average]

TABLE OF EXCEEDANCE PERCENTILES

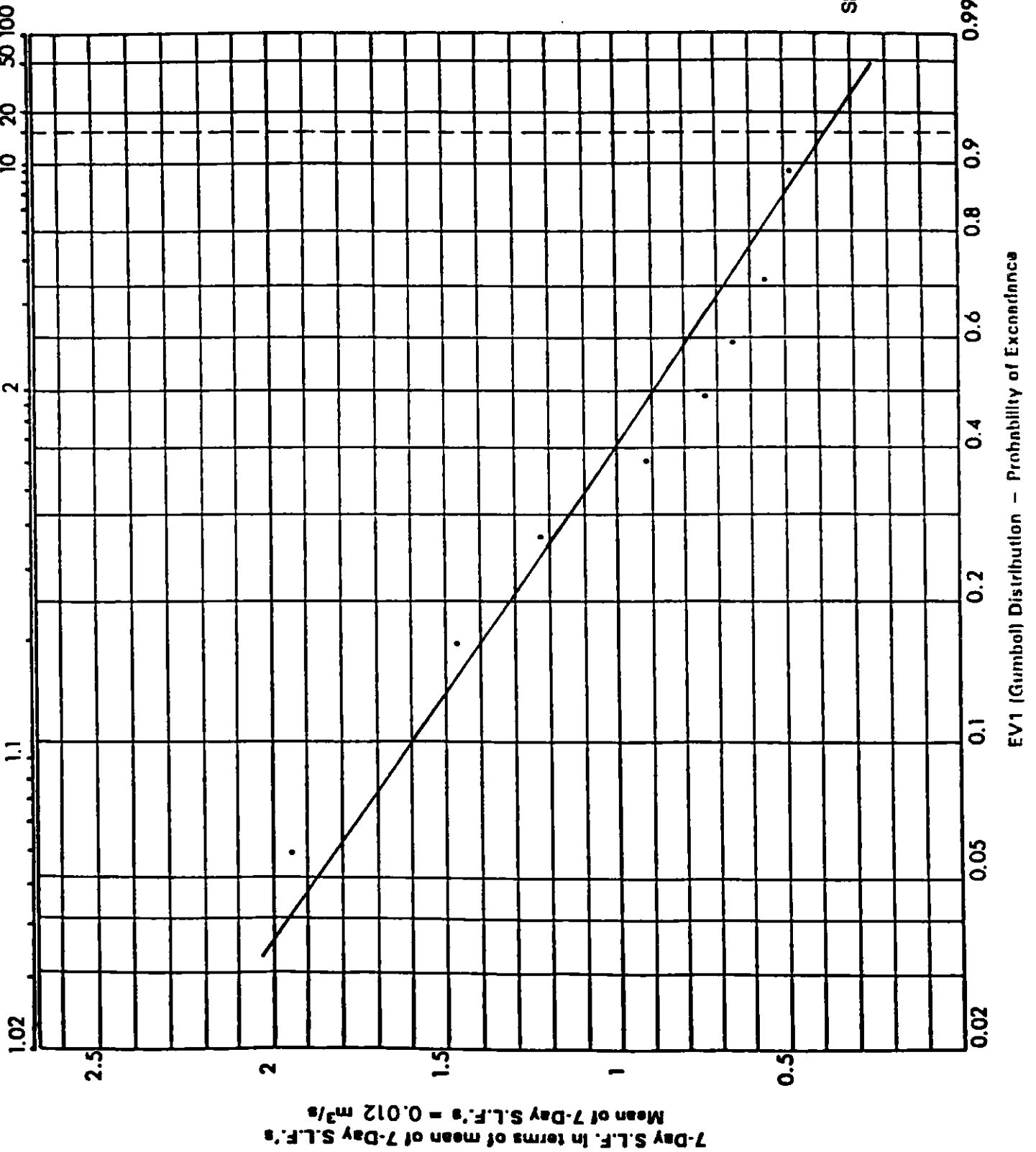
Year 1981 Only					
5%	0.76	30%	0.20	75%	0.06
10%	0.49	40%	0.14	80%	0.05
15%	0.36	50%	0.11	85%	0.03
20%	0.30	60%	0.09	90%	0.02
25%	0.24	70%	0.07	95%	0.01

** All flow rates above are in cubic metres per second. **



Data for 1976 for
Station No. 0806 HOLE IN THE WALL
is not available

Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0806
R. MAYNE AT HOLE IN THE WALL
for period 1977 to 1985



STATION NO 0814

Sheet A

Mill at Skerries

Body Responsible: DUC

N. G. R.: D 256 601

Catchment Area to Station: 11.7 sq km
Long Average Rainfall [1941-1970]: 770 mm/yr

Data based on continuous water level records for the period :
8-Jun-84 to 31-Dec-87

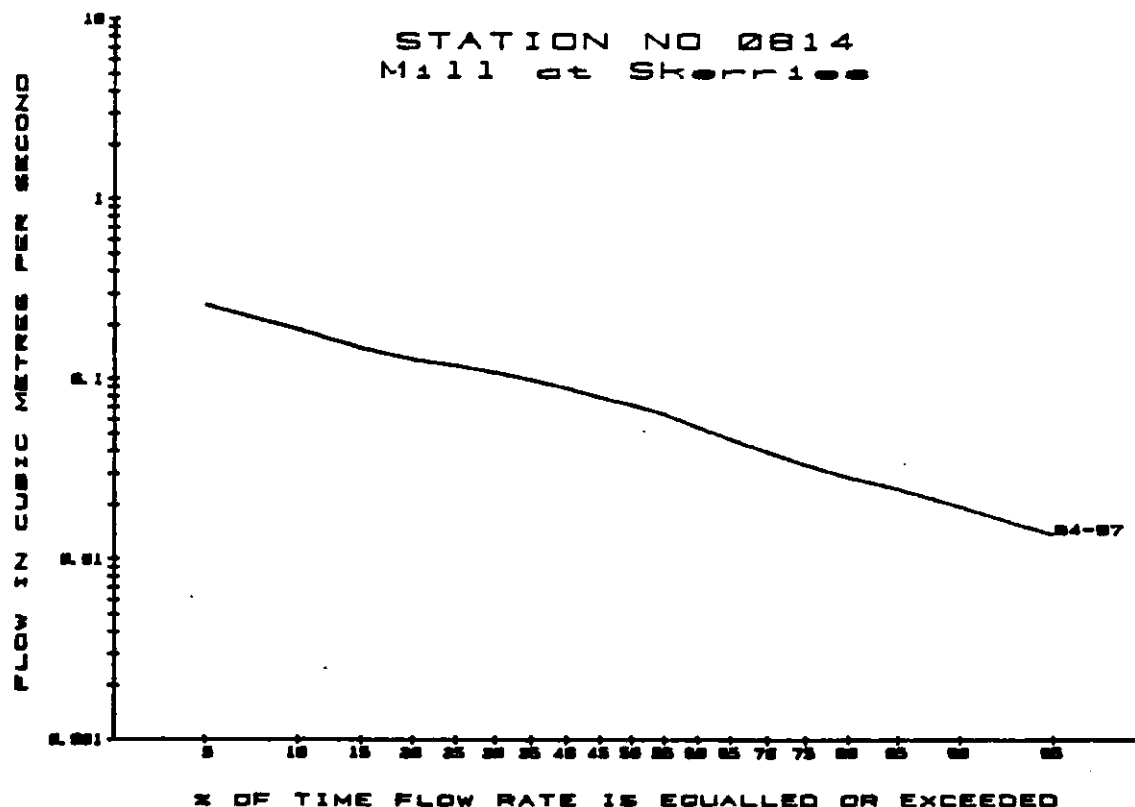
Mean Flow Rate: 0.10 [276 mm/yr rainfall on catchment]

Daily Mean Flows: minimum < 0.010 on 30-Aug-84
maximum 3.14 on 21-Oct-87

TABLE OF EXCEEDANCE PERCENTILES

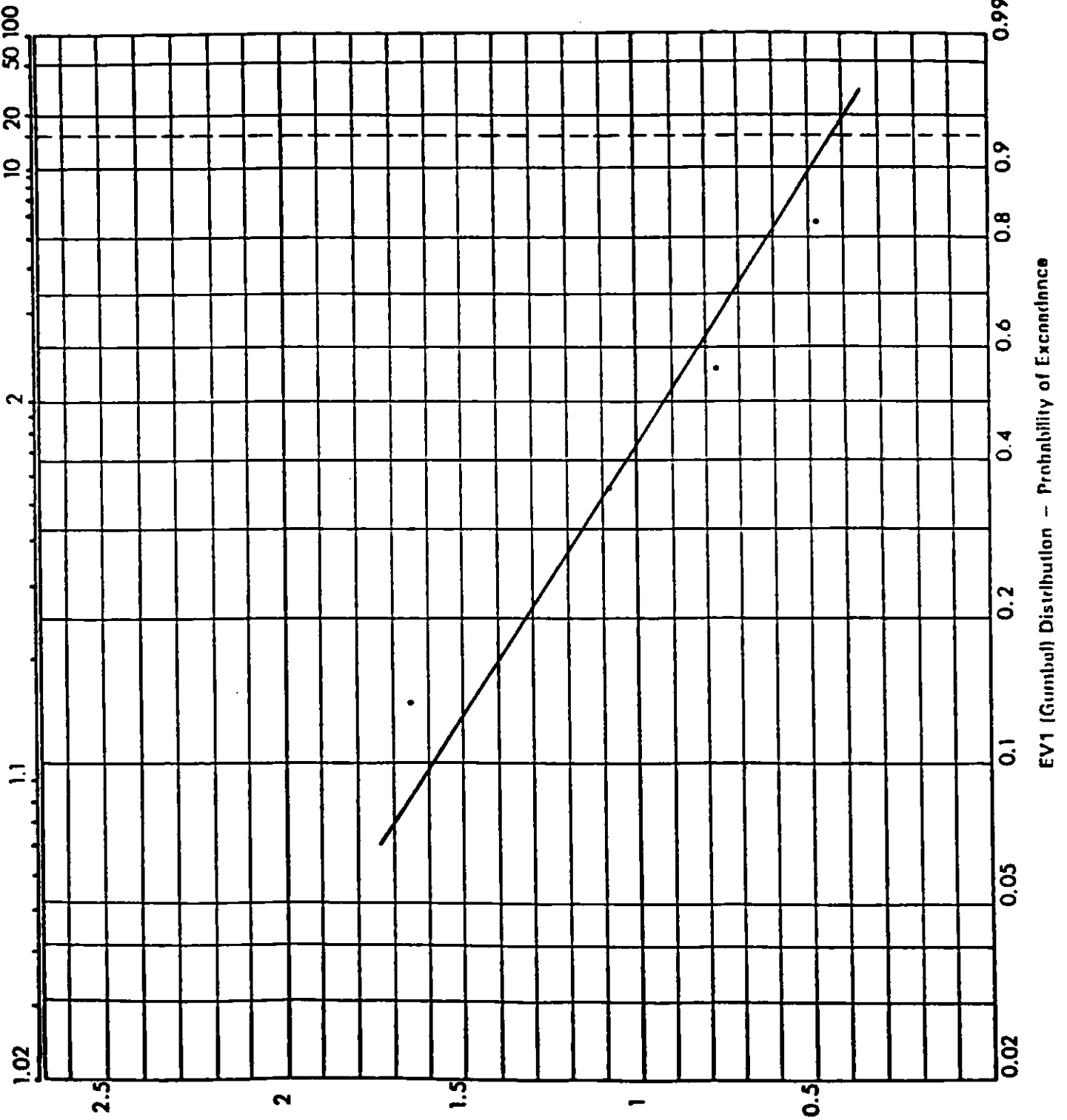
		Full period			
5%	0.26	30%	0.11	75%	0.03
10%	0.19	40%	0.09	80%	0.03
15%	0.15	50%	0.07	85%	0.03
20%	0.13	60%	0.06	90%	0.02
25%	0.12	70%	0.04	95%	0.01

** All flow rates above are in cubic metres per second. **



Data for 1981 for
Station No. 0814 SKERRIES
is not available

Data for 1976 for
Station No. 0814 SKERRIES
is not available



Distribution of
SEVEN-DAY SUSTAINED FLOWS
at Station No. 0814
R. MILL AT SKERRIES
for period 1984 to 1987.

STATION NO 0905

Sheet A

Cammoek at Clondalkin

Body Responsible: DUC

N. G. R.: 0 093 321

Catchment Area to Station: 51.0 sq km
 Long Average Rainfall [1941-1970]: 879 mm/yr

Data based on continuous water level records for the period :
 1-Jan-77 to 31-Dec-81

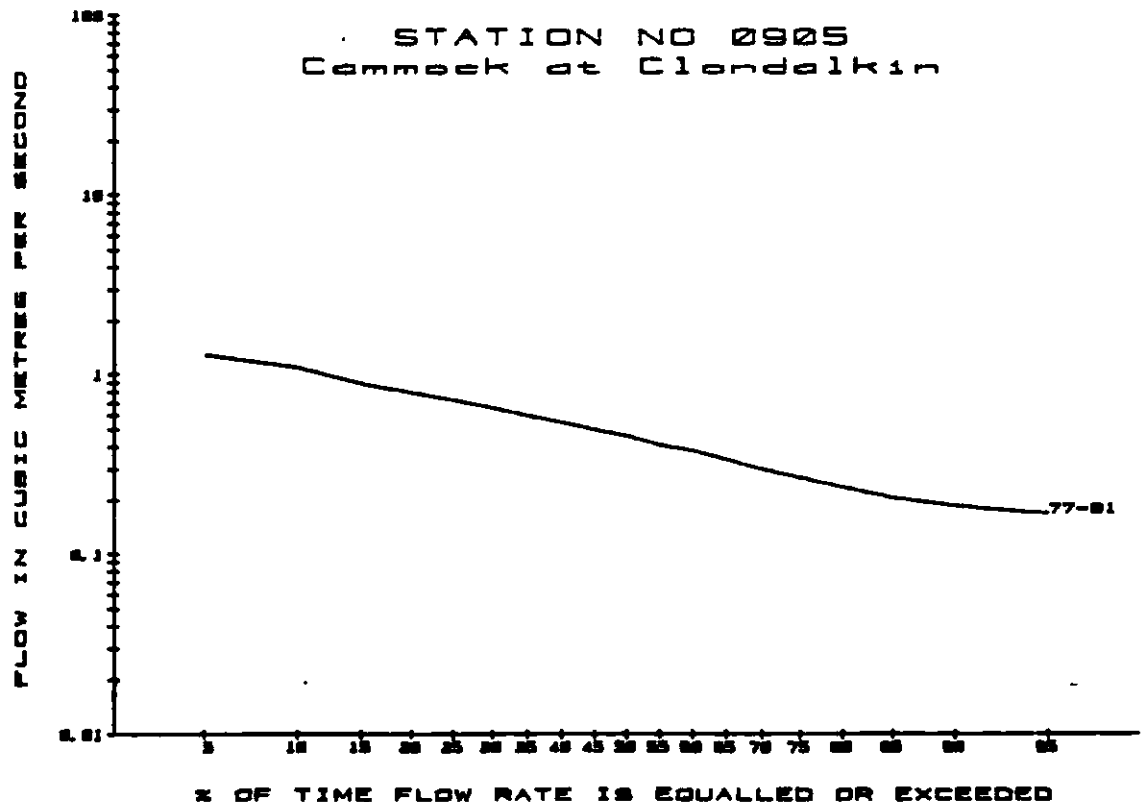
Mean Flow Rate: 0.57 [353 mm/yr rainfall on catchment]

Daily Mean Flows: minimum 0.079 on 12-Aug-77
 maximum 4.44 on 21-Jan-80

TABLE OF EXCEEDANCE PERCENTILES

		Full period			
5%	1.30	30%	0.66	75%	0.27
10%	1.10	40%	0.55	80%	0.24
15%	0.90	50%	0.46	85%	0.21
20%	0.80	60%	0.38	90%	0.19
25%	0.73	70%	0.30	95%	0.17

** All flow rates above are in cubic metres per second. **



STATION NO 0905

Sheet B

Cammoek at Clondalkin

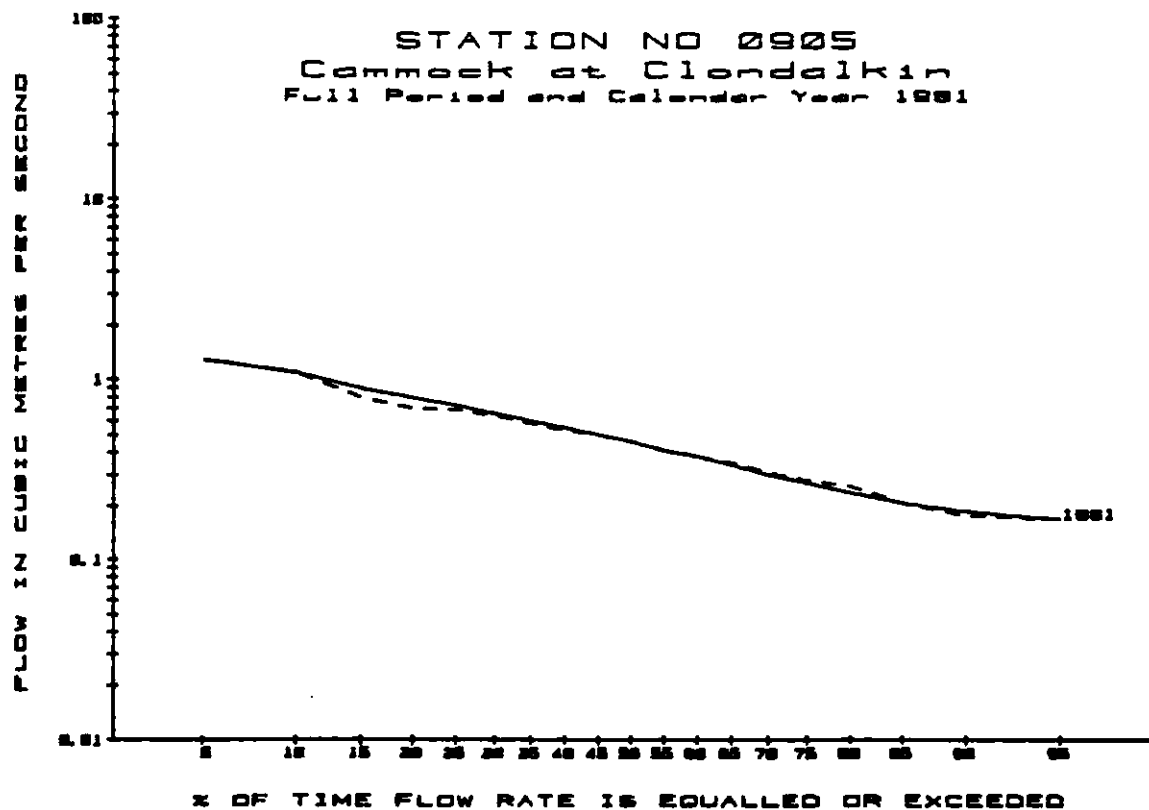
Data based on continuous water level records for the period :
1-Jan-77 to 31-Dec-81

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	0.146	0.172	0.18	0.27	
1977-1981	0.161	0.192	0.22	0.30	[Average]

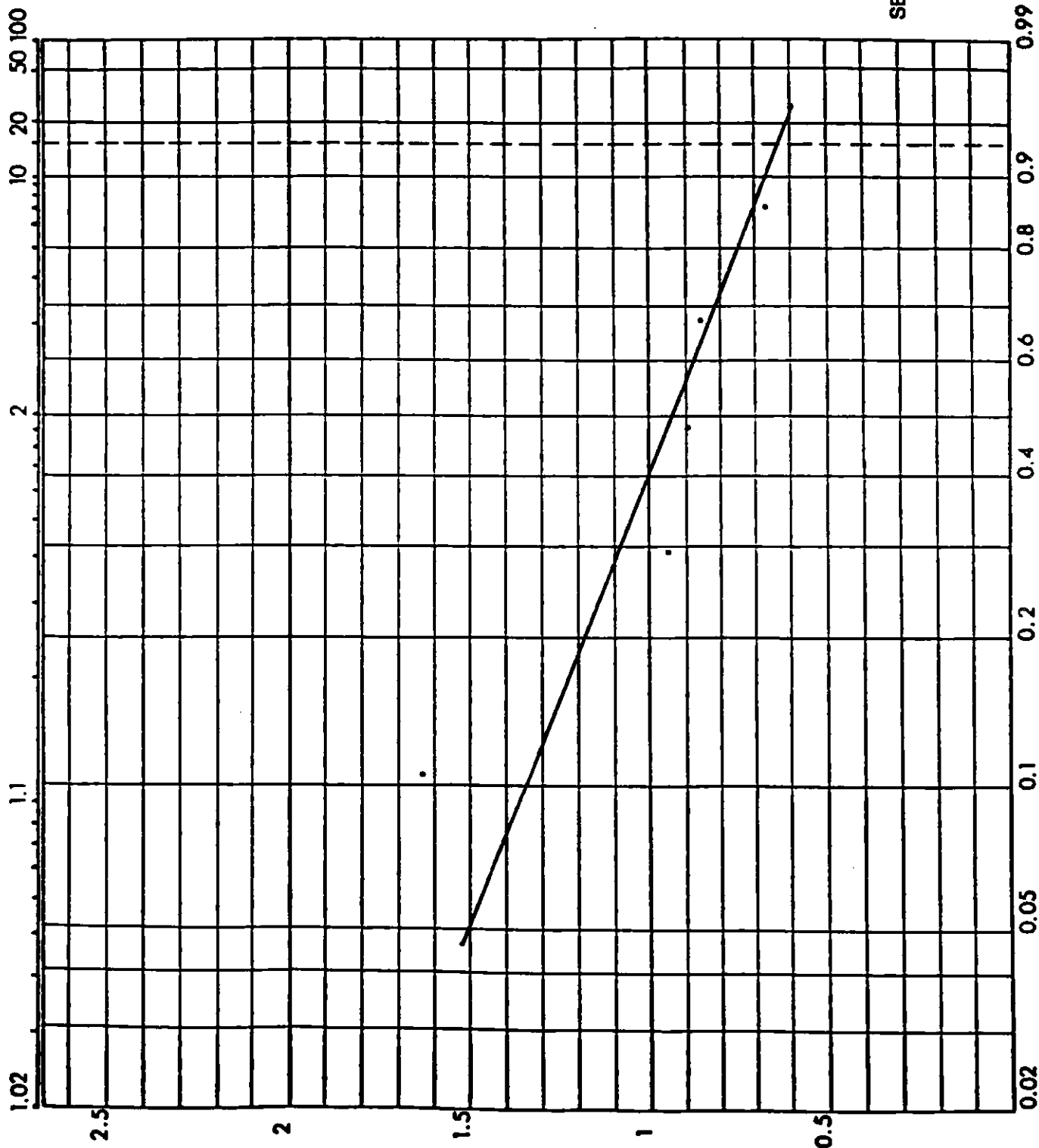
TABLE OF EXCEEDANCE PERCENTILES

Year 1981 Only					
5%	1.30	30%	0.64	75%	0.28
10%	1.10	40%	0.53	80%	0.26
15%	0.80	50%	0.46	85%	0.21
20%	0.70	60%	0.38	90%	0.18
25%	0.59	70%	0.31	95%	0.17

** All flow rates above are in cubic metres per second. **



Data for 1976 for
Station No. 0905 CLONDALKIN
is not available



Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0905
R. CAMMOCK AT CLONDALKIN
for period 1977 to 1981

EV1 (Gumbel) Distribution - Probability of Exceedence

STATION NO 0909

Sheet A

Owendohr at Willbrook Road

Body Responsible: DUC

N.G.R.: 0 142 287

Catchment Area to Station: 22.4 sq km
 Long Average Rainfall [1941-1970]: 1000 mm/yr

Data based on continuous water level records for the period:
 1-Jan-81 to 31-Dec-87

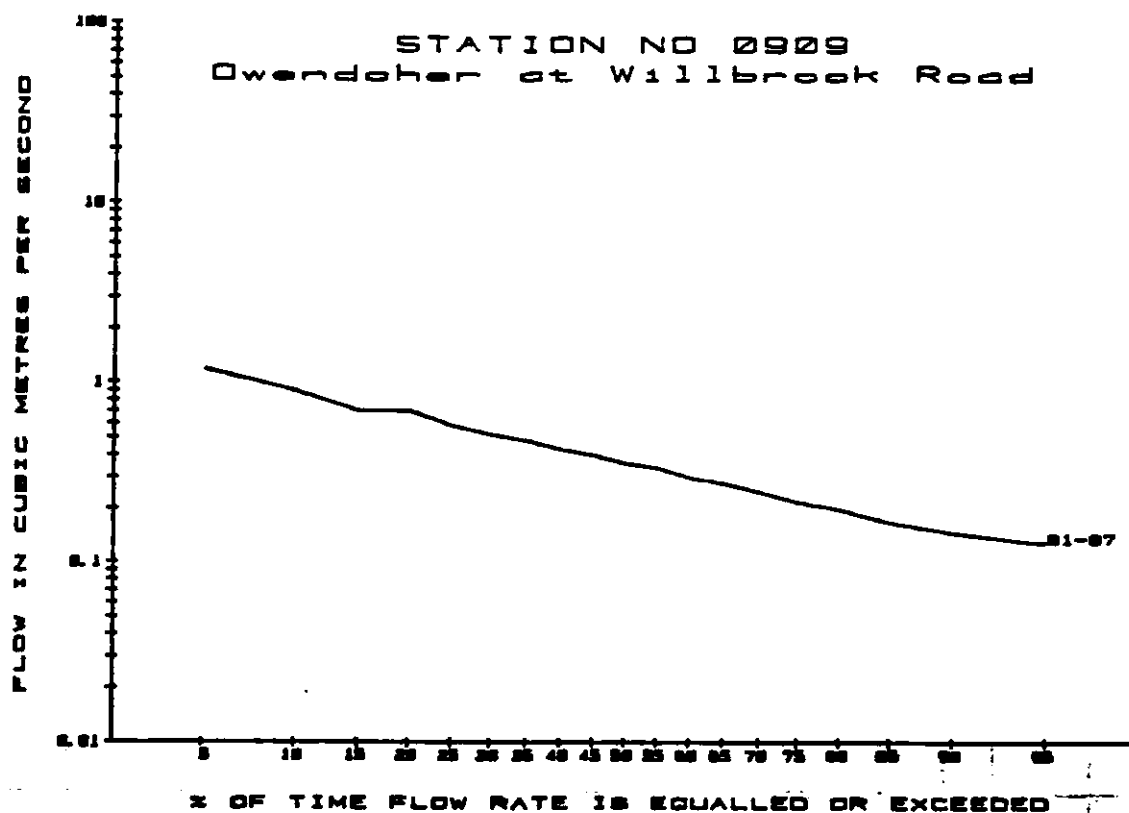
Mean Flow Rate: 0.48 [676 mm/yr rainfall on catchment]

Daily Mean Flows: minimum 0.080 on 17-Sep-82
 maximum 7.60 on 25-Aug-86

TABLE OF EXCEEDANCE PERCENTILES

		Full period			
5%	1.20	30%	0.52	75%	0.22
10%	0.90	40%	0.43	80%	0.20
15%	0.70	50%	0.36	85%	0.17
20%	0.70	60%	0.30	90%	0.15
25%	0.58	70%	0.25	95%	0.13

** All flow rates above are in cubic metres per second. **



STATION NO 0909

Sheet B

Owendaher at Willbrook Road

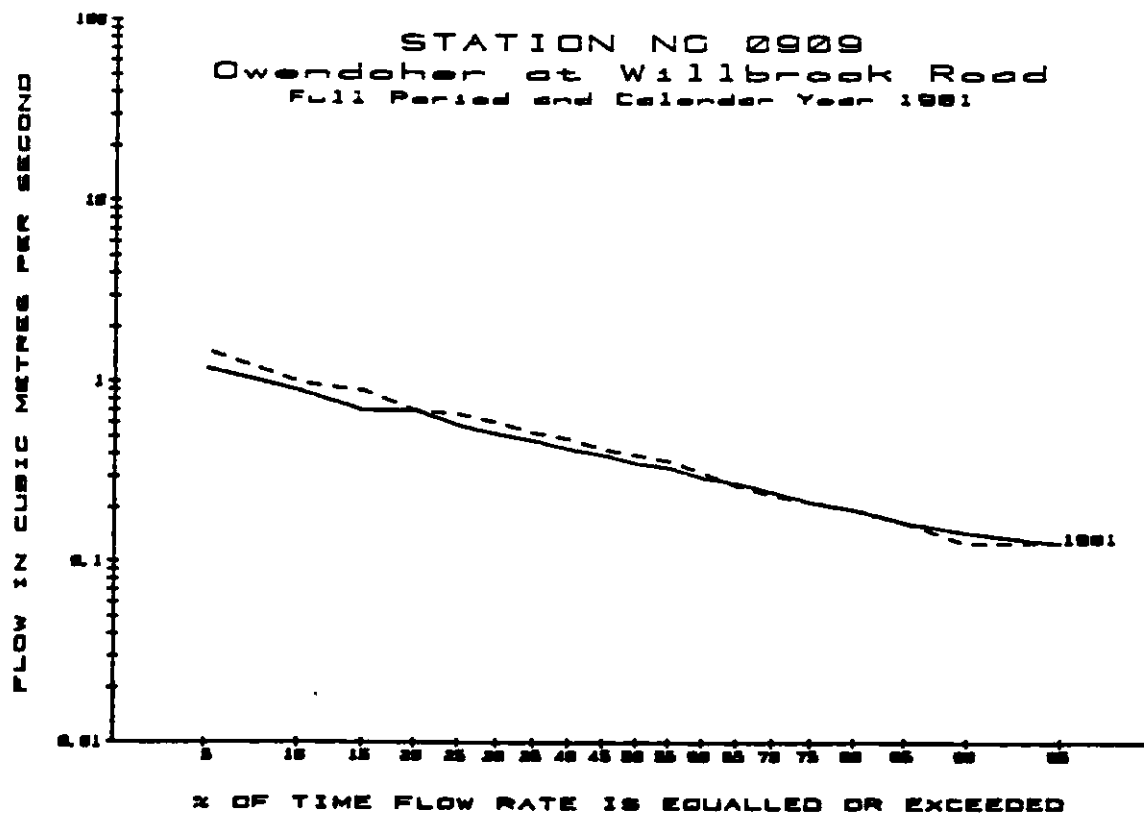
Data based on continuous water level records for the period :
1-Jan-81 to 31-Dec-87

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	0.123	0.130	0.13	0.14	
1981-1987	0.133	0.150	0.18	0.25	[Average]

TABLE OF EXCEEDANCE PERCENTILES

Year 1981 Only					
5%	1.50	30%	0.60	75%	0.22
10%	1.00	40%	0.49	80%	0.20
15%	0.90	50%	0.40	85%	0.17
20%	0.70	60%	0.32	90%	0.13
25%	0.67	70%	0.24	95%	0.13

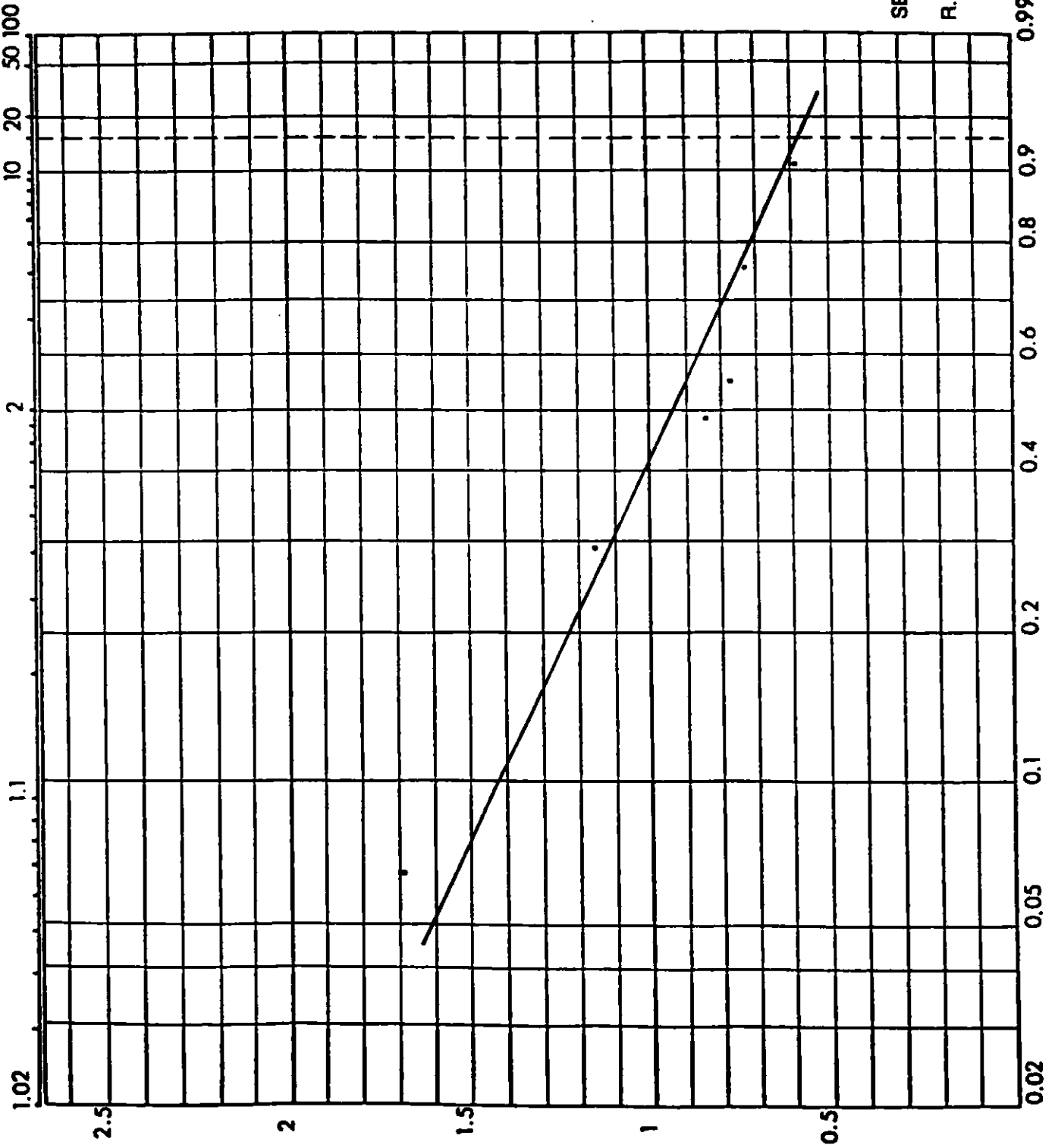
** All flow rates above are in cubic metres per second. **



Data for 1976 for
Station No. 0909 WILLBROOK ROAD
is not available

return period in years

Sheet 0



Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0909
R. OWENDOHER AT WILLBROOK ROAD
for period 1981 to 1987

STATION NO 0911

Sheet A

Slang at Frankfort

Body Responsible: DUC

N.G.R.: 0 168 287

Catchment Area to Station: 6.5 sq km
Long Average Rainfall [1941-1970]: 870 mm/yr

Data based on continuous water level records for the period :
6-May-82 to 31-Dec-87

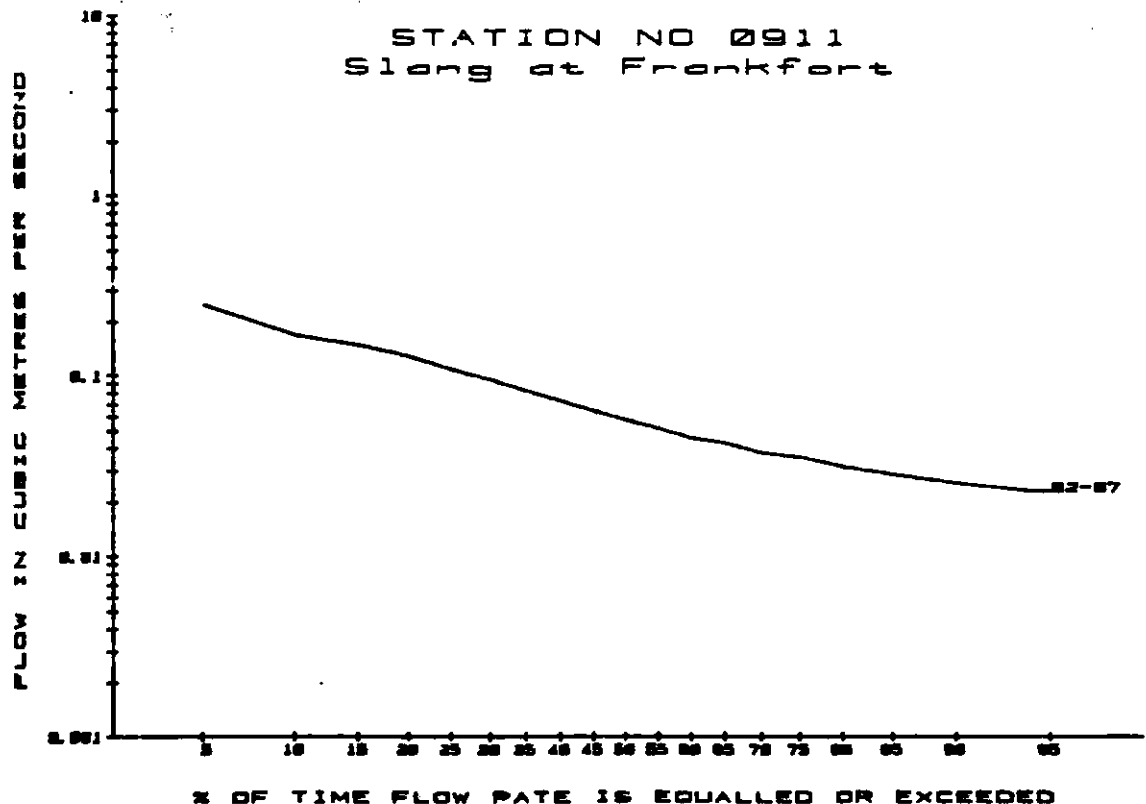
Mean Flow Rate: 0.09 [453 mm/yr rainfall on catchment]

Daily Mean Flows: minimum 0.011 on 15-Sep-82
maximum 2.70 on 6-Nov-82

TABLE OF EXCEEDANCE PERCENTILES

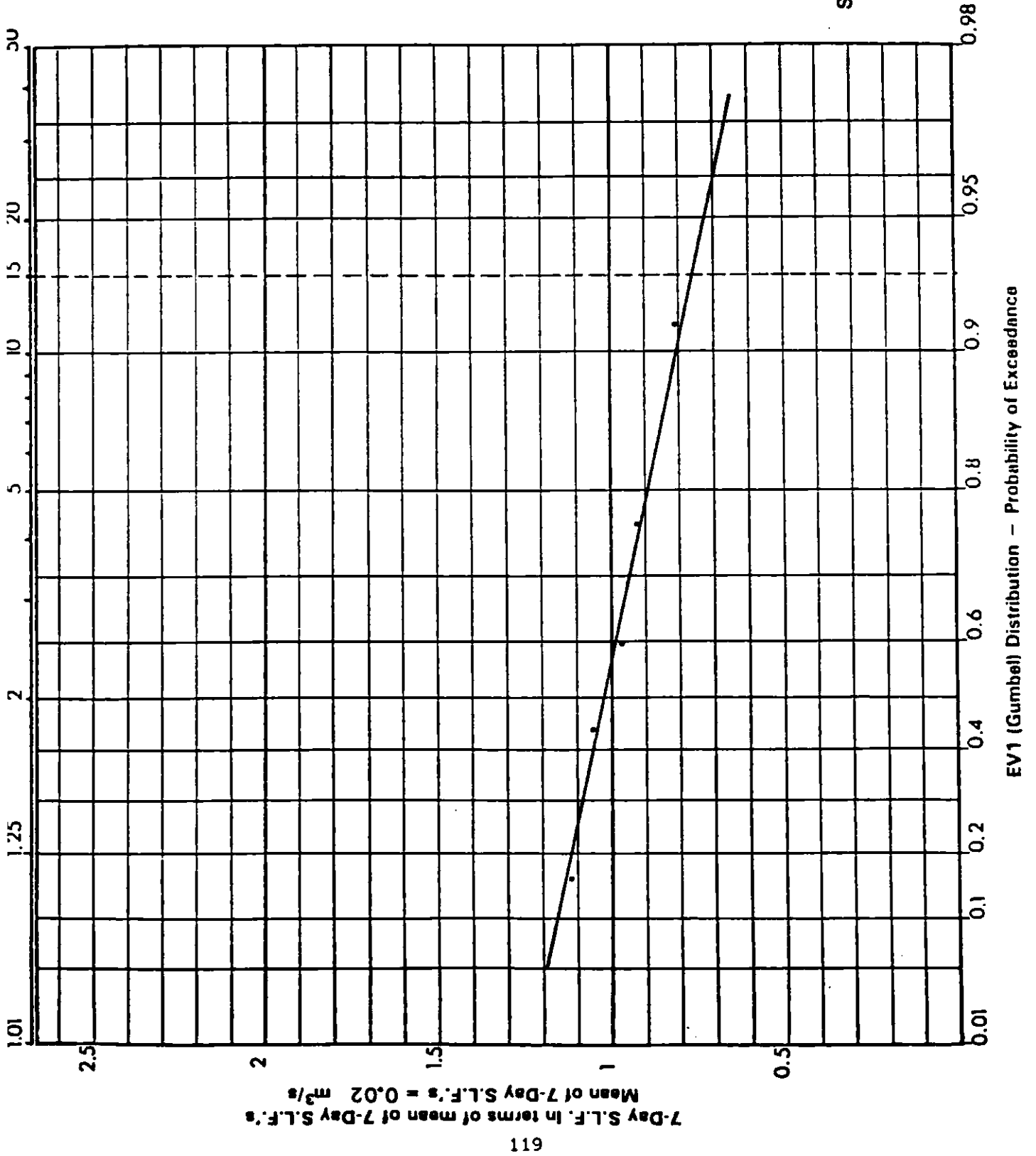
Full period					
5%	0.25	30%	0.10	75%	0.04
10%	0.17	40%	0.07	80%	0.03
15%	0.15	50%	0.06	85%	0.03
20%	0.13	60%	0.05	90%	0.03
25%	0.11	70%	0.04	95%	0.02

** All flow rates above are in cubic metres per second. **



Data for 1981 for
Station No. 0911 FRANKFORT
is not available

Data for 1976 for
Station No. 0911 FRANKFORT
is not available



Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 0911
R. SLANG AT FRANKFORT
for period 1982-1987.

STATION NO 1002

Sheet A

Avonmore at Rathdrum

Body Responsible: ESB

N.G.R.: T 197 883

Catchment Area to Station: 233.0 sq km
 Long Average Rainfall [1941-1970]: 1727 mm/yr

Data based on continuous water level records for the period :
 1-Jan-67 to 31-Dec-85*

Mean Flow Rate: 7.95 [1077 mm/yr rainfall on catchment]

Daily Mean Flows: minimum 0.210 on 15-Aug-83
 maximum 84.77 on 31-Oct-77

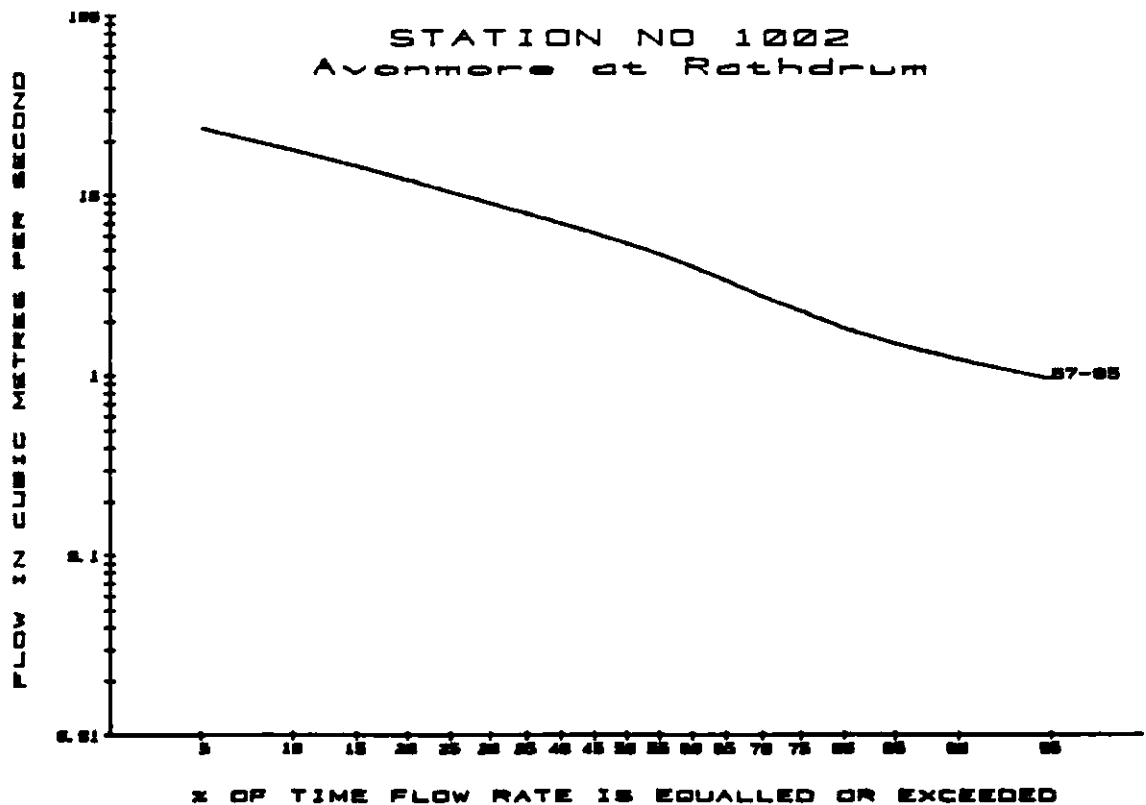
TABLE OF EXCEEDANCE PERCENTILES

		Full period			
5%	23.80	30%	9.14	75%	2.32
10%	17.90	40%	7.07	80%	1.86
15%	14.70	50%	5.46	85%	1.53
20%	12.30	60%	4.07	90%	1.25
25%	10.54	70%	2.78	95%	0.97

** Note : Lowest Measured Flow 0.11 on 8-Sept-59. **

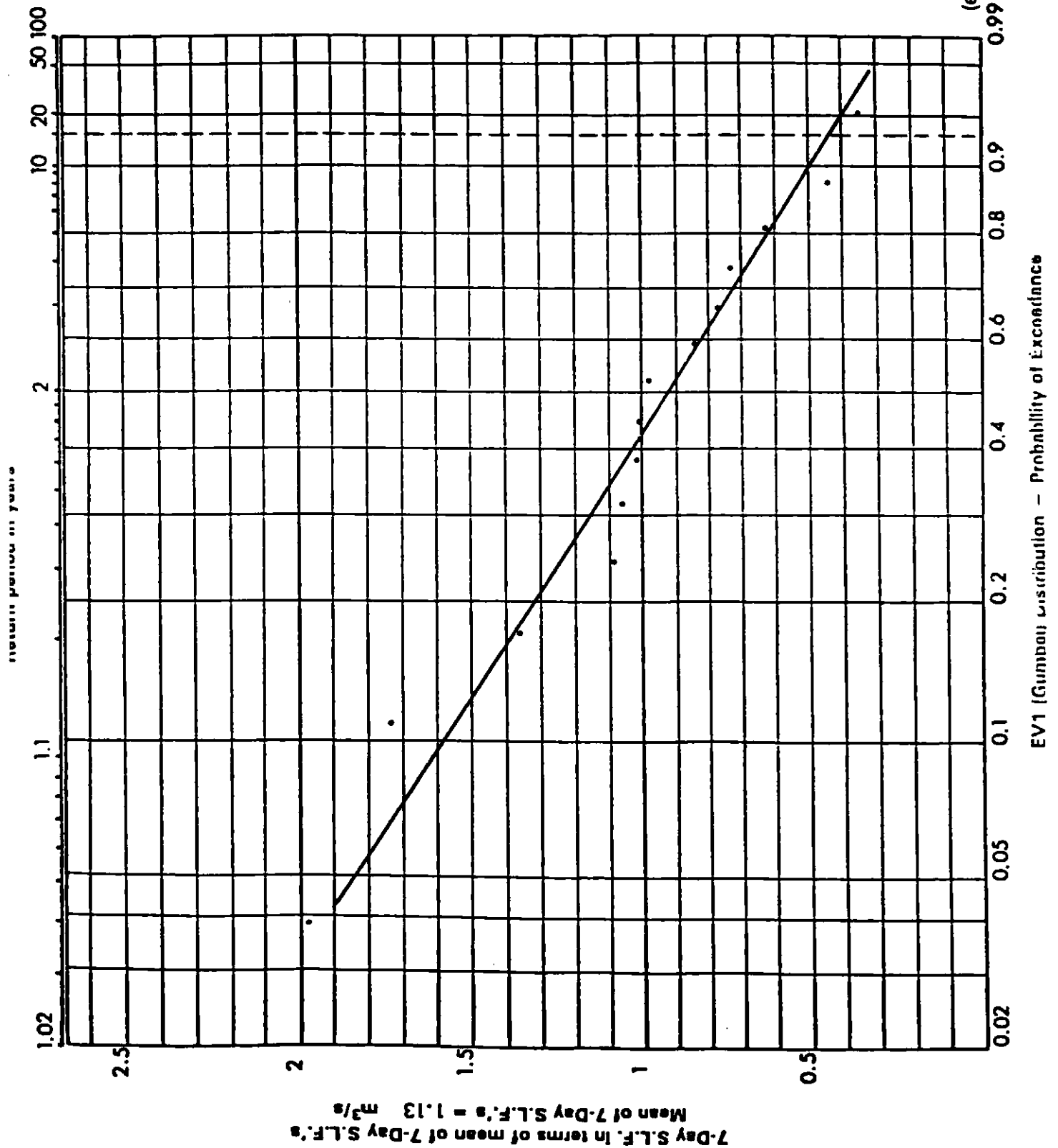
** All flow rates above are in cubic metres per second. **

* excl. data for 1976, 1979, 1980, 1981 and 1982



Data for 1981 for
Station No. 1002 RATHDRUM
is not available

Data for 1976 for
Station No. 1002 RATHDRUM
is not available



Distribution of
SEVEN-DAY SUSTAINED FLOWS
at Station No. 1002
R. AVONMORE AT RATHDRUM
for period 1967 to 1985
(excl. data for 1976, '79, '80, '81, '82).

STATION NO 1003

Sheet A

Avonmore at Lough

Body Responsible: ESB

N.G.R.: T 146 965

Catchment Area to Station: 107.0 sq km
 Long Average Rainfall [1941-1970]: 1646 mm/yr

Data based on continuous water level records for the period :
 1-Jan-46 to 31-Dec-84*

Mean Flow Rate: 3.80 [1120 mm/yr rainfall on catchment]

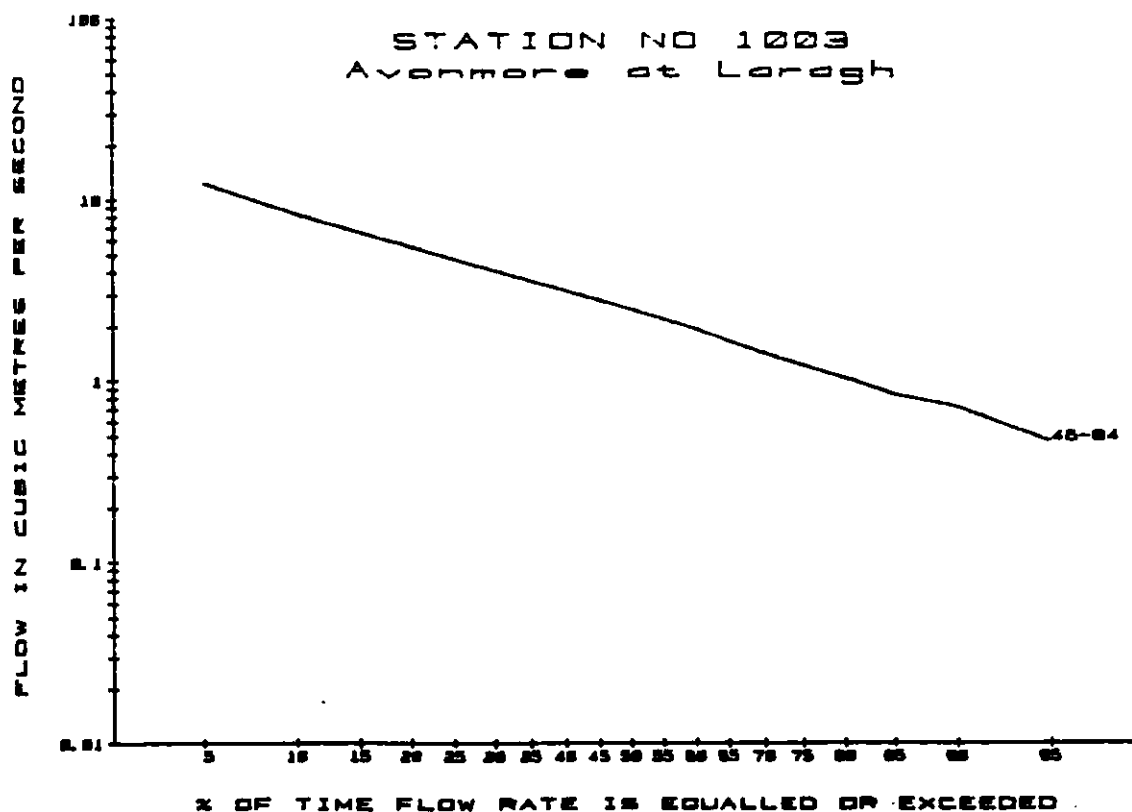
Daily Mean Flows: minimum 0.170 on 8-Sep-76
 maximum 63.54 on 25-Sep-57

TABLE OF EXCEEDANCE PERCENTILES

		Full period			
5%	12.41	30%	4.09	75%	1.23
10%	8.38	40%	3.18	80%	1.05
15%	6.65	50%	2.50	85%	0.85
20%	5.54	60%	1.95	90%	0.73
25%	4.72	70%	1.43	95%	0.47

** All flow rates above are in cubic metres per second. **

* excl. data for 1966, 1967 and 1970



STATION NO 1003

Sheet B

Avenmore at Lough

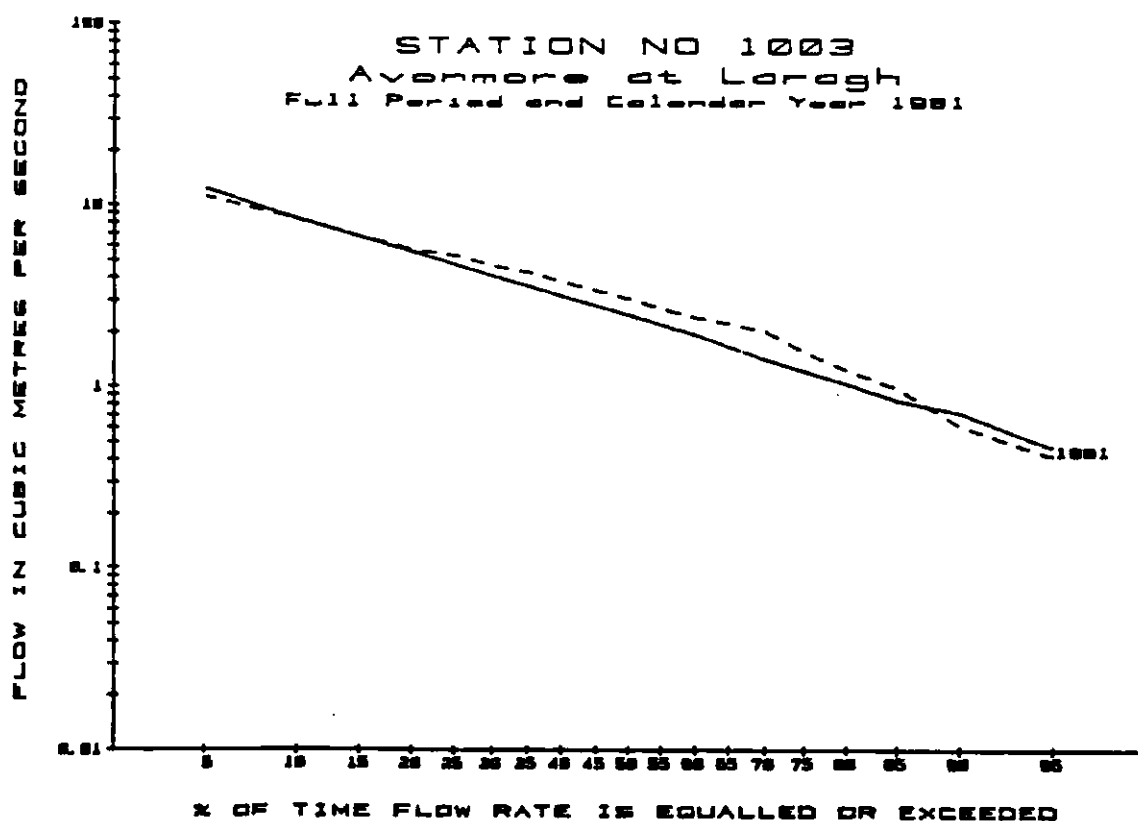
Data based on continuous water level records for the period :
1-Jan-46 to 31-Dec-84*

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	0.328	0.336	0.47	0.47	
1946-1984	7.479	0.532	0.70	1.17	(Average)

TABLE OF EXCEEDANCE PERCENTILES					
Year 1981 Only					
5%	11.20	30%	4.66	75%	1.57
10%	8.40	40%	3.81	80%	1.25
15%	6.70	50%	3.07	85%	0.99
20%	5.70	60%	2.43	90%	0.62
25%	5.29	70%	2.03	95%	0.42

** All flow rates above are in cubic metres per second. **

* excl. data for 1966, 1967 and 1970



STATION NO 1003

Sheet C

Avonmore at Laragh

Data based on continuous water level records for the period :
1-Jan-46 to 31-Dec-84*

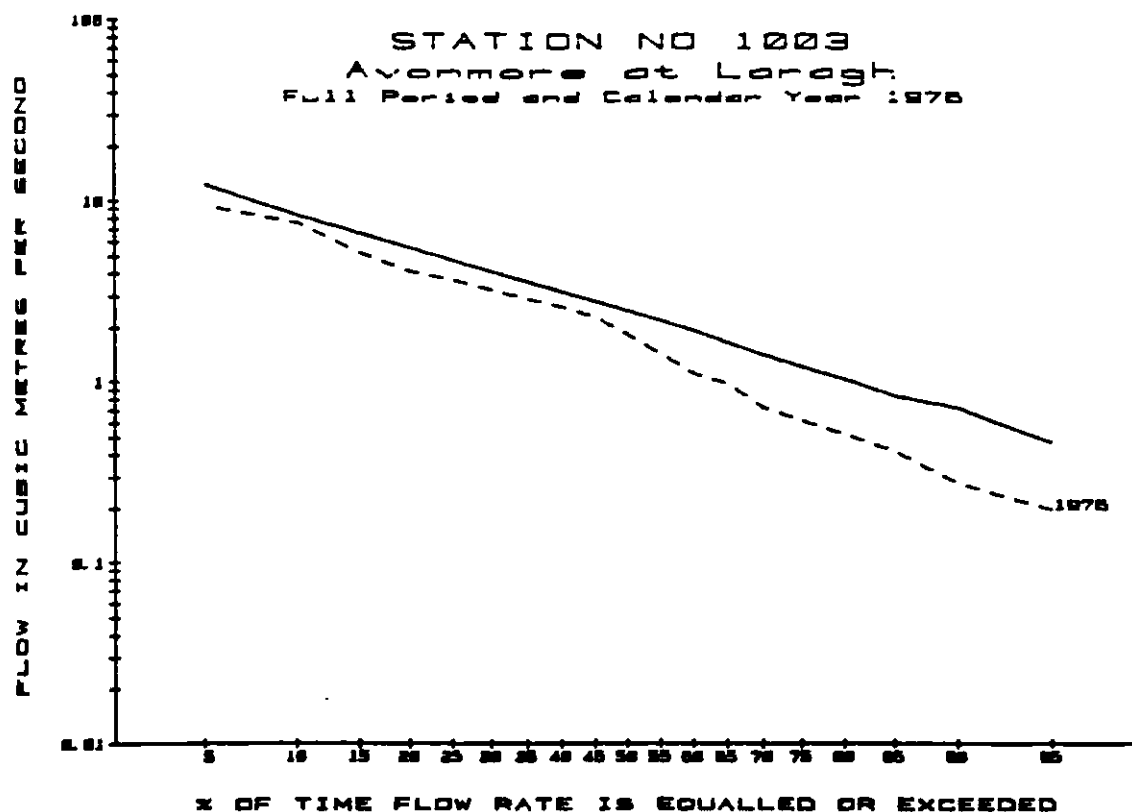
PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1976	0.173	0.182	0.23	0.30	
1946-1984	0.173	0.182	0.23	0.26	(Min)

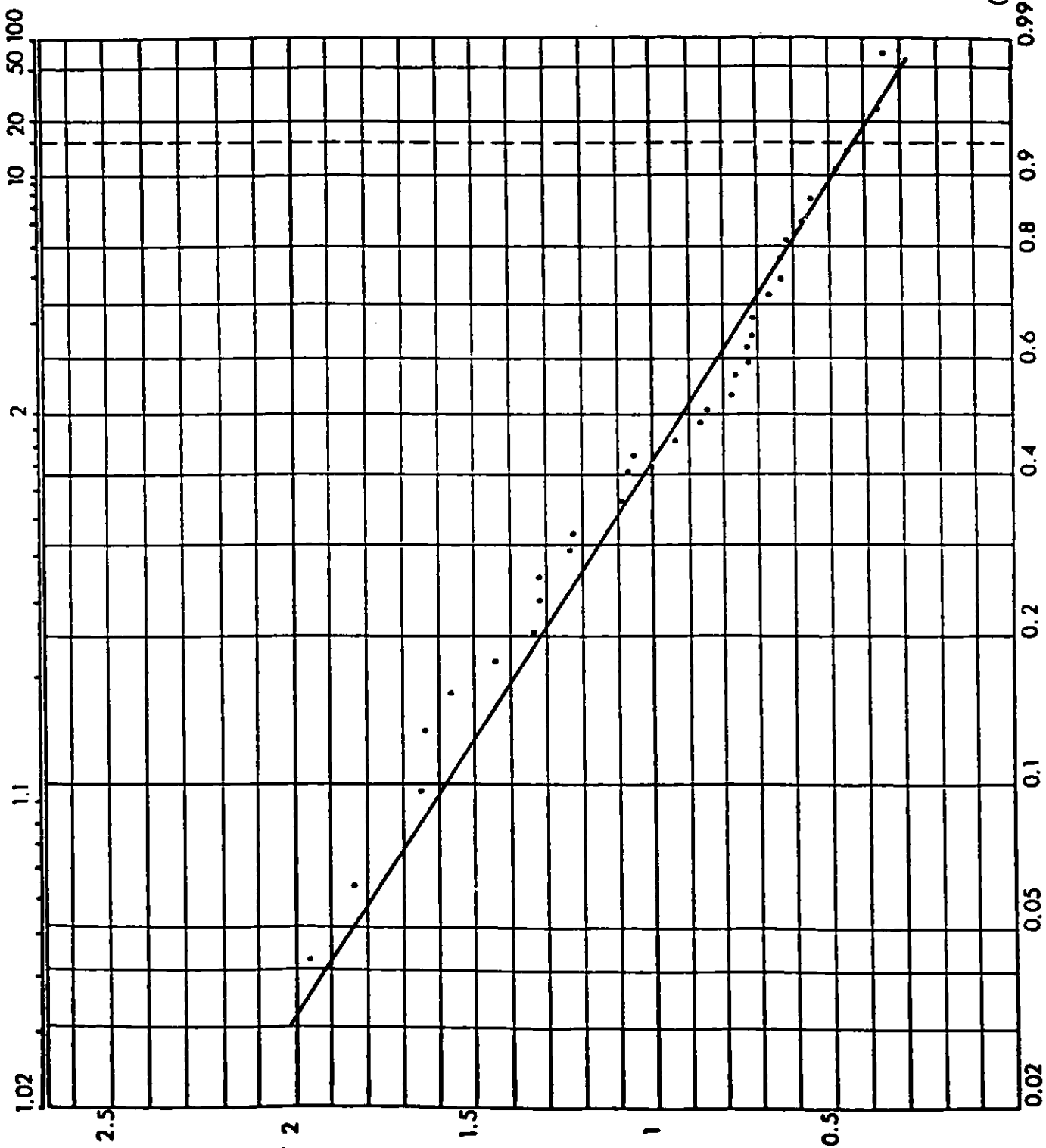
TABLE OF EXCEEDANCE PERCENTILES

Year 1976 Only					
5%	9.50	30%	3.25	75%	0.62
10%	7.60	40%	2.62	80%	0.52
15%	5.20	50%	1.85	85%	0.42
20%	4.10	60%	1.13	90%	0.28
25%	3.68	70%	0.73	95%	0.20

** All flow rates above are in cubic metres per second. **

* excl. data for 1966, 1967 and 1970





Distribution of
SEVEN-DAY SUSTAINED FLOWS
at Station No. 1003
R. AVONMORE AT LARAGH
for period 1946 to 1984
(excl. data for 1966, 1967 and 1970).

STATION NO 1004

Sheet A

GLENMACNASS at LARAGH

Body Responsible: ESB

N. G. R.: T 143 965

Catchment Area to Stations: 28.0 sq km
 Long Average Rainfall [1941-1970]: 1978 mm/yr

Data based on continuous water level records for the period :
 1-Jan-75 to 31-Dec-84

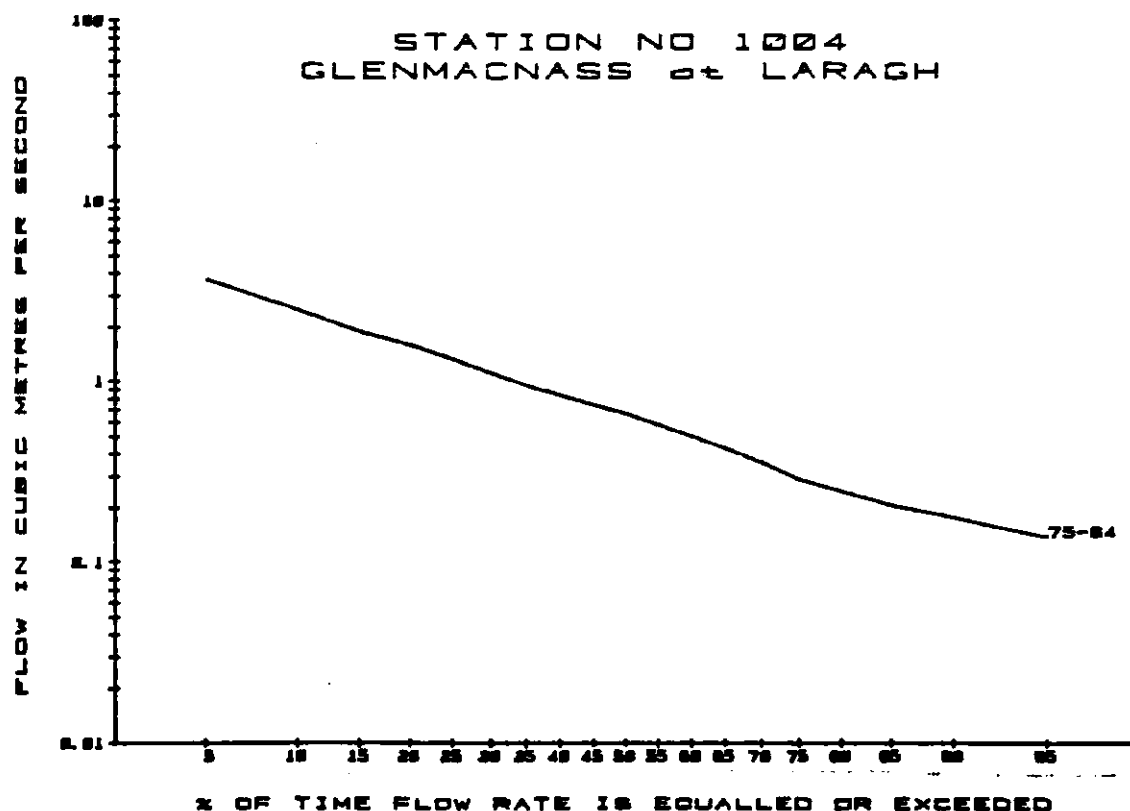
Mean Flow Rate: 1.12 [1241 mm/yr rainfall on catchment]

Daily Mean Flows: minimum 0.058 on 12-Aug-83
 maximum 17.20 on 27-Dec-78

TABLE OF EXCEEDANCE PERCENTILES

		PERCENTILES			
		Full period			
5%	3.70	30%	1.12	75%	0.29
10%	2.50	40%	0.85	80%	0.25
15%	1.90	50%	0.67	85%	0.21
20%	1.60	60%	0.50	90%	0.18
25%	1.34	70%	0.36	95%	0.14

** All flow rates above are in cubic metres per second. **



STATION NO 1004

Sheet B

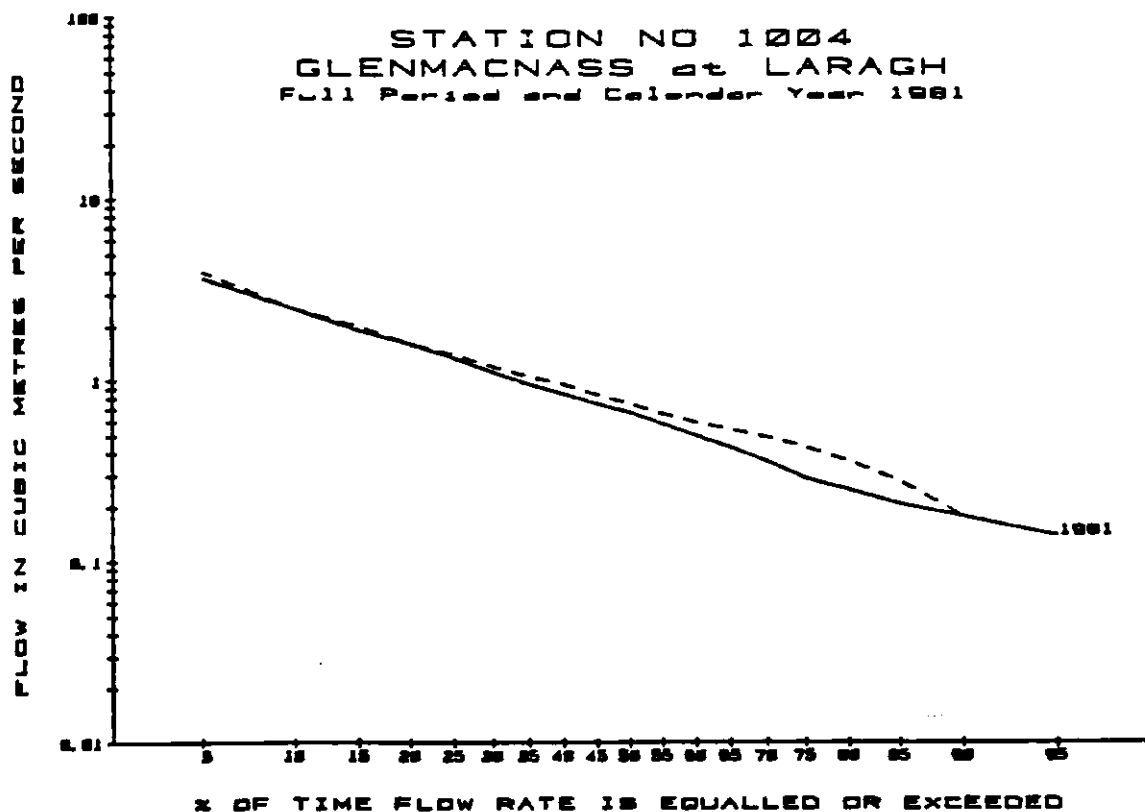
GLENMACNASS at LARAGH

Data based on continuous water level records for the period :
1-Jan-75 to 31-Dec-84

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	0.101	0.141	0.15	0.49	
1975-1984	0.119	0.133	0.16	0.27	[Average]

TABLE OF EXCEEDANCE PERCENTILES					
Year 1981 Only					
5%	4.00	30%	1.20	75%	0.43
10%	2.50	40%	0.96	80%	0.36
15%	2.00	50%	0.75	85%	0.28
20%	1.60	60%	0.59	90%	0.18
25%	1.40	70%	0.49	95%	0.14

** All flow rates above are in cubic metres per second. **



STATION NO 1004

Sheet C

GLENMACNASS at LARAGH

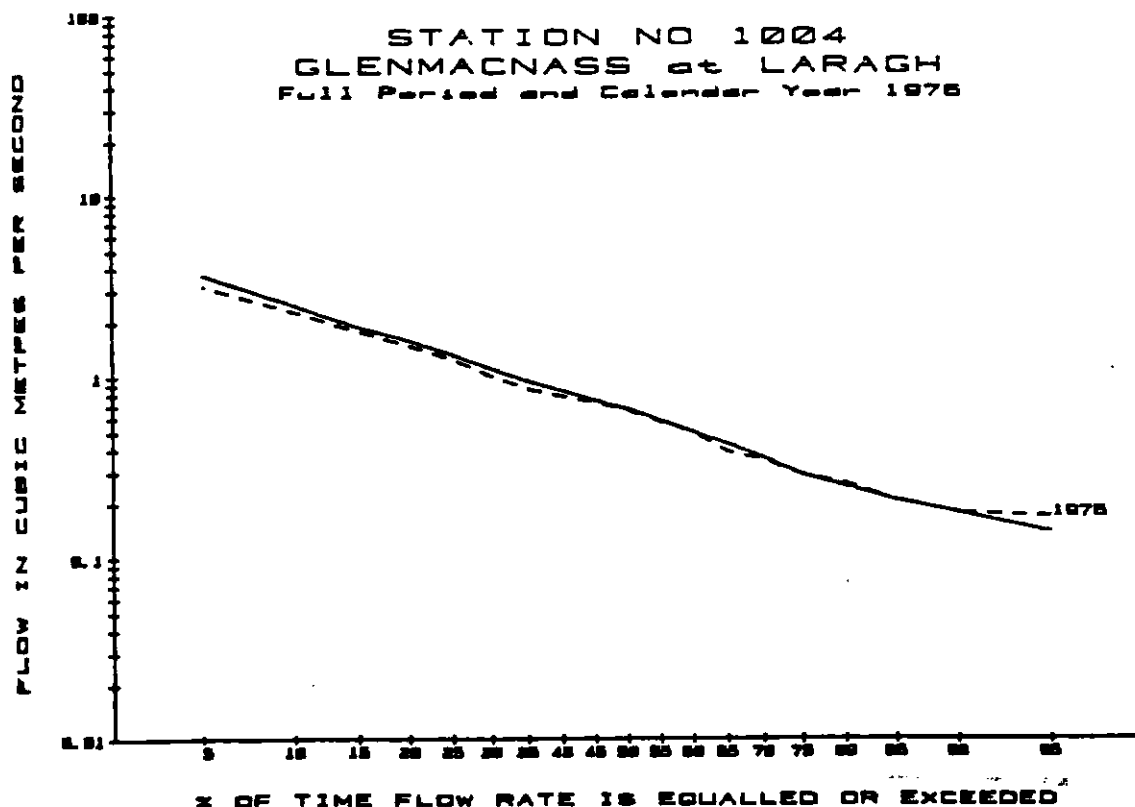
Data based on continuous water level records for the period :
1-Jan-75 to 31-Dec-84

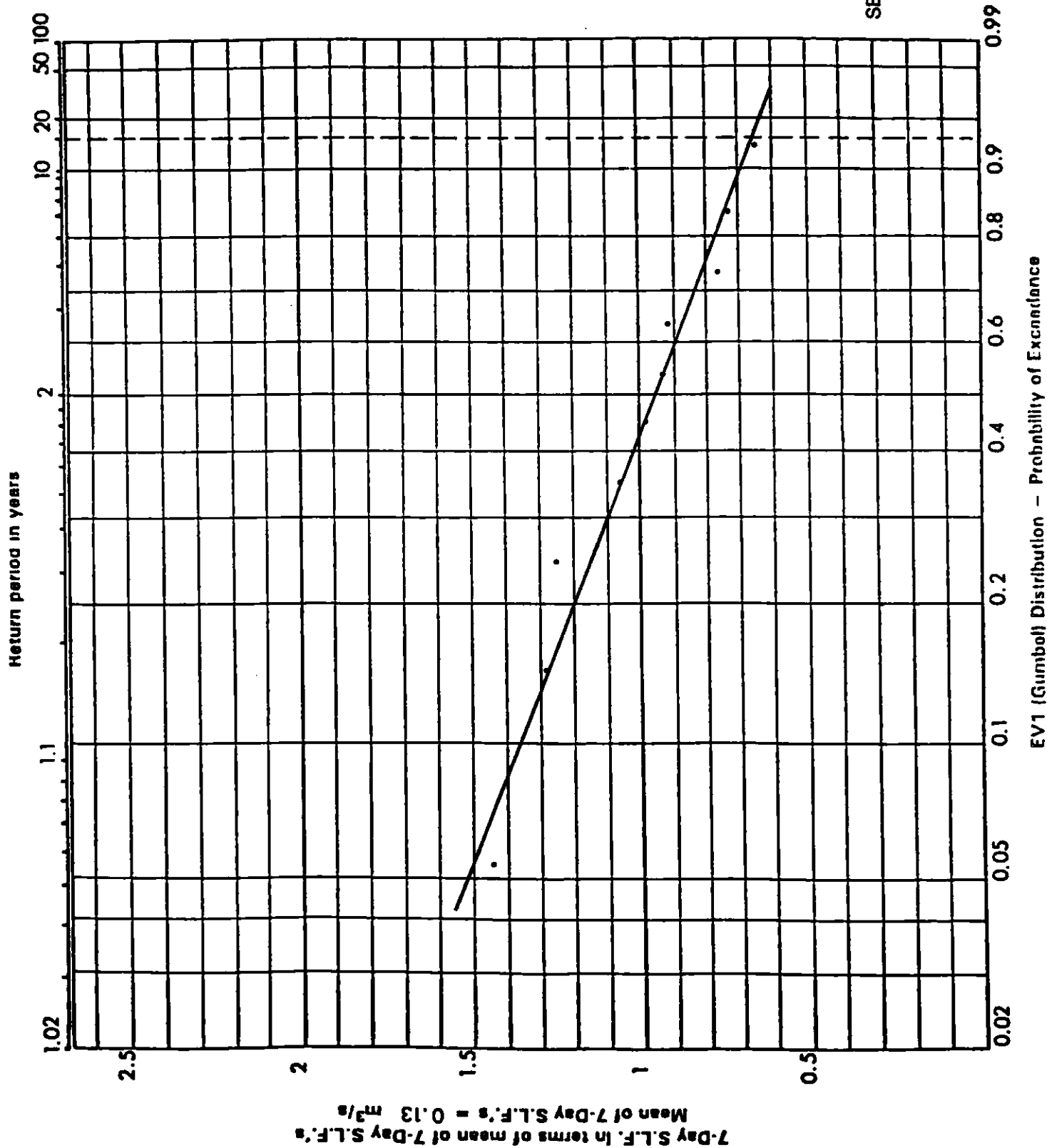
PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1976	0.122	0.122	0.17	0.18	
1975-1984	0.076	0.084	0.10	0.13	(Min)

TABLE OF EXCEEDANCE PERCENTILES

Year 1976 Only					
5%	3.20	30%	1.02	75%	0.29
10%	2.30	40%	0.79	80%	0.26
15%	1.80	50%	0.66	85%	0.21
20%	1.50	60%	0.50	90%	0.18
25%	1.26	70%	0.35	95%	0.17

** All flow rates above are in cubic metres per second. **





Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 1004
R. GLENMACNASS AT LARAGH
for period 1975 to 1984

STATION NO 1017

Sheet A

Ballyman at Ballyman

Body Responsible: DUC

N. G. R.: 0 227 187

Catchment Area to Station: 3.8 sq km
 Long Average Rainfall [1941-1970]: 1050 mm/yr

Data based on continuous water level records for the period :
 1-Jan-77 to 31-Dec-87*

Mean Flow Rate: 0.06 [481 mm/yr rainfall on catchment]

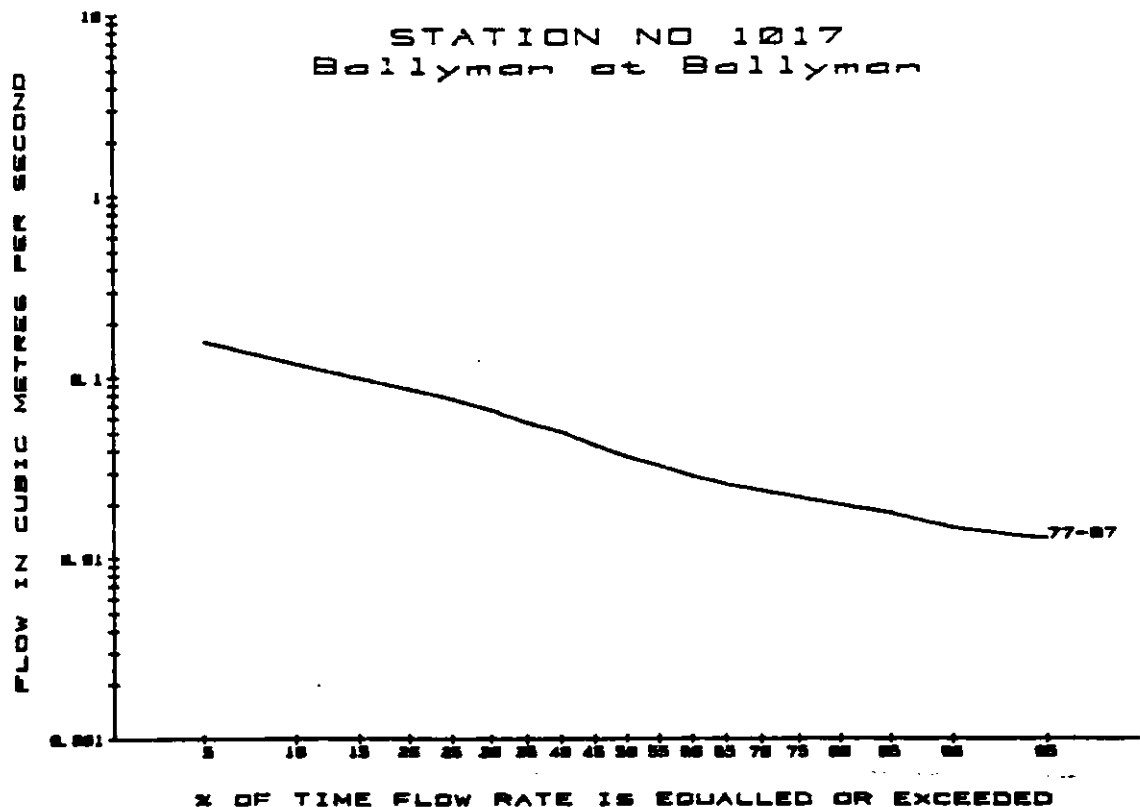
Daily Mean Flows: minimum < 0.010 on 11-Oct-84
 maximum 1.25 on 27-Dec-78

TABLE OF EXCEEDANCE PERCENTILES

		Full period			
5%	0.16	30%	0.07	75%	0.02
10%	0.12	40%	0.05	80%	0.02
15%	0.10	50%	0.04	85%	0.02
20%	0.09	60%	0.03	90%	0.02
25%	0.08	70%	0.02	95%	0.01

** All flow rates above are in cubic metres per second. **

* excl. data for 1980



STATION NO 1017

Sheet B

Ballyman at Ballyman

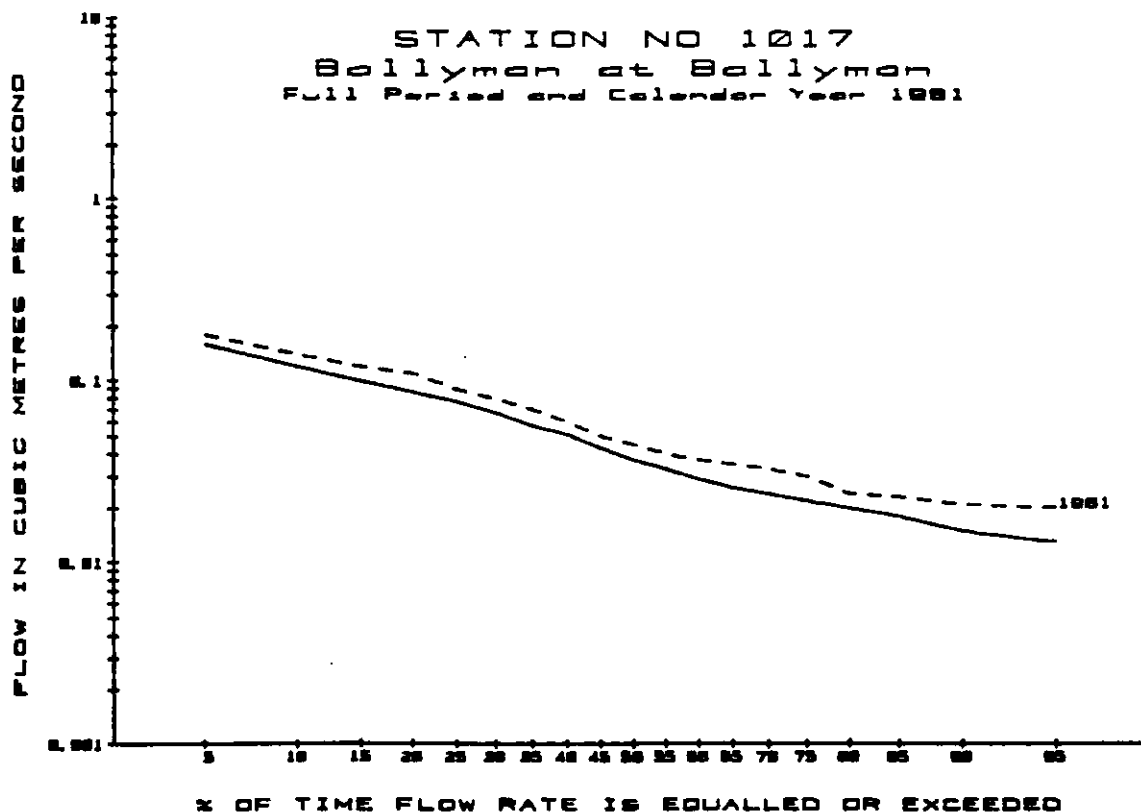
Data based on continuous water level records for the period :
1-Jan-77 to 31-Dec-87*

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	0.019	0.019	0.02	0.02	
1977-1987	0.013	0.014	0.02	0.02	[Average]

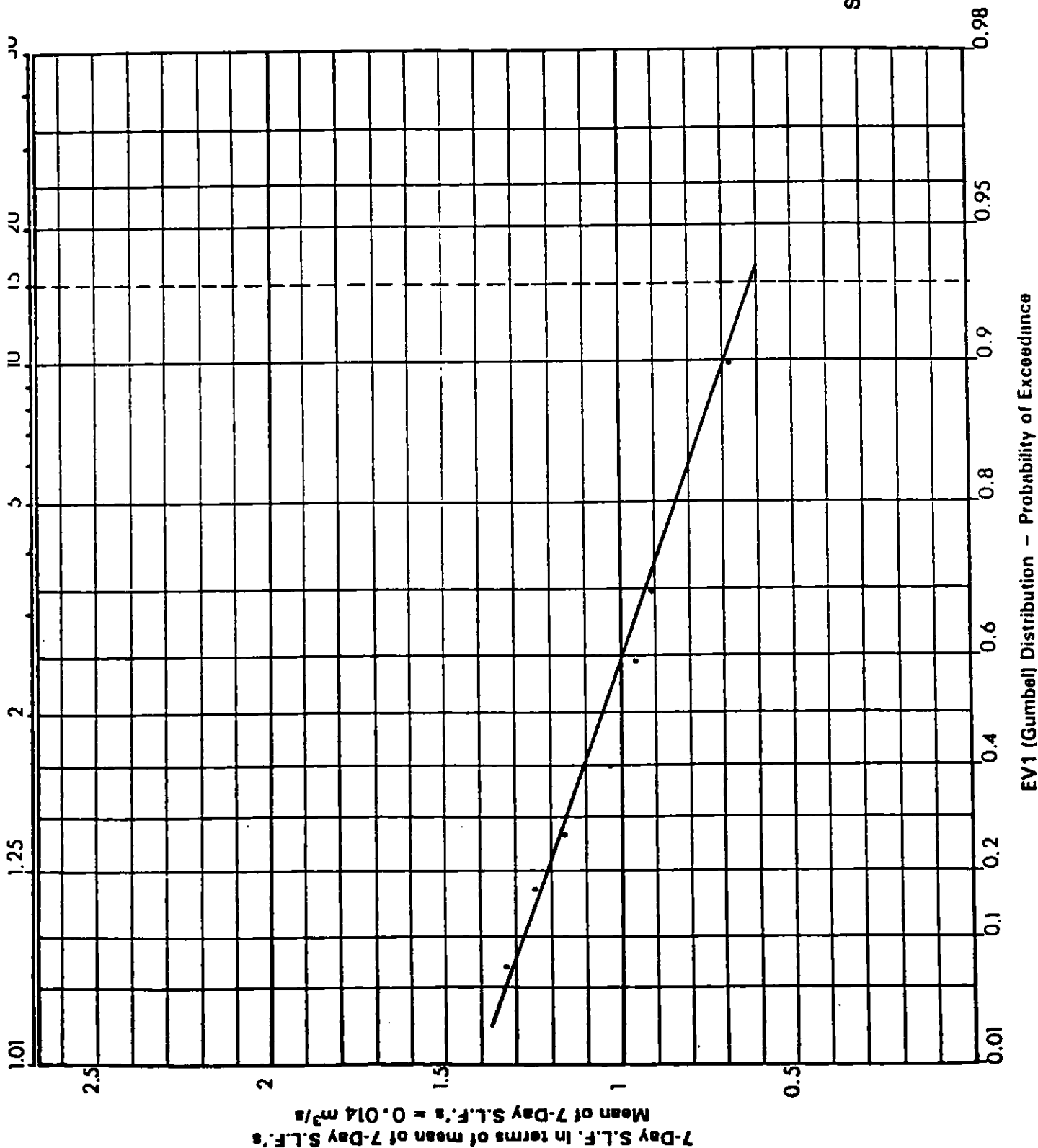
TABLE OF EXCEEDANCE PERCENTILES					
Year 1981 Only					
5%	0.18	30%	0.08	75%	0.03
10%	0.14	40%	0.06	80%	0.02
15%	0.12	50%	0.05	85%	0.02
20%	0.11	60%	0.04	90%	0.02
25%	0.09	70%	0.03	95%	0.02

** All flow rates above are in cubic metres per second. **

* excl. data for 1980



Data for 1976 for
Station No. 1017 BALLYMAN
is not available



Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 1017
R. BALLYMAN AT BALLYMAN
for period 1977 to 1987
(excl. data for 1980).

STATION NO 1019

Sheet A

Ballyman at Vallombrosa

Body Responsible: DUC

N.G.R.: 0 246 183

Catchment Area to Station: 5.7 sq km
Long Average Rainfall [1941-1970]: 1010 mm/yr

Data based on continuous water level records for the period :
15-May-77 to 31-Dec-87

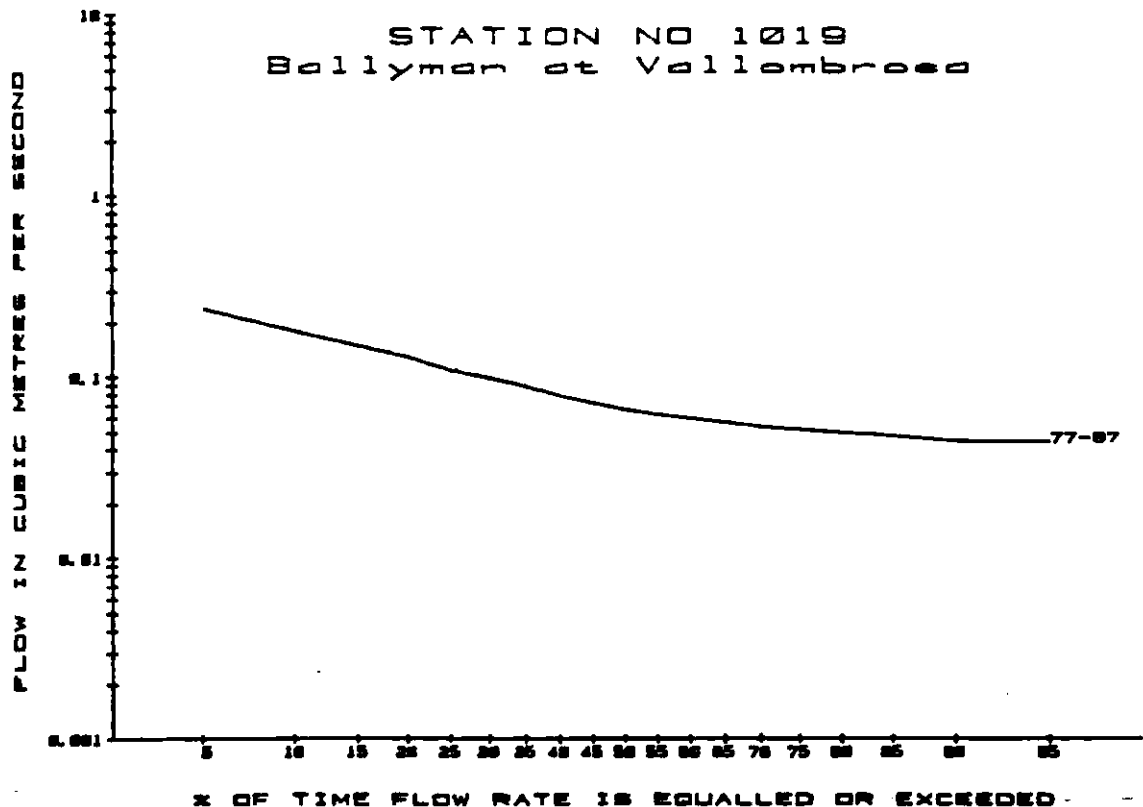
Mean Flow Rate: 0.10 [528 mm/yr rainfall on catchment]

Daily Mean Flows: minimum 0.036 on 7-Oct-84
maximum 0.90 on 29-Dec-81

TABLE OF EXCEEDANCE PERCENTILES

		Full period			
5%	0.24	30%	0.10	75%	0.05
10%	0.18	40%	0.08	80%	0.05
15%	0.15	50%	0.07	85%	0.05
20%	0.13	60%	0.06	90%	0.05
25%	0.11	70%	0.05	95%	0.04

** All flow rates above are in cubic metres per second. **



STATION NO 1019

Sheet B

Ballyman at Vallombrosa

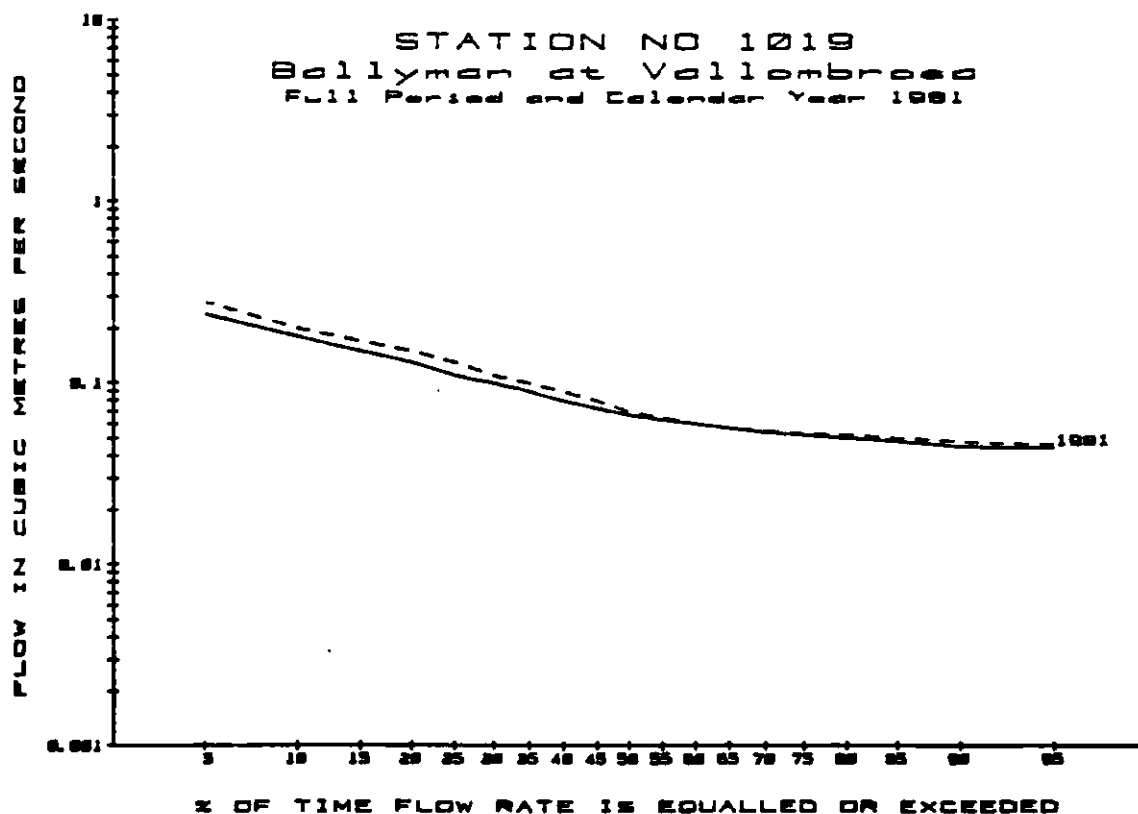
Data based on continuous water level records for the period :
16-May-77 to 31-Dec-87

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	0.042	0.044	0.05	0.05	
1977-1987	0.042	0.044	0.05	0.05	[Average]

TABLE OF EXCEEDANCE PERCENTILES

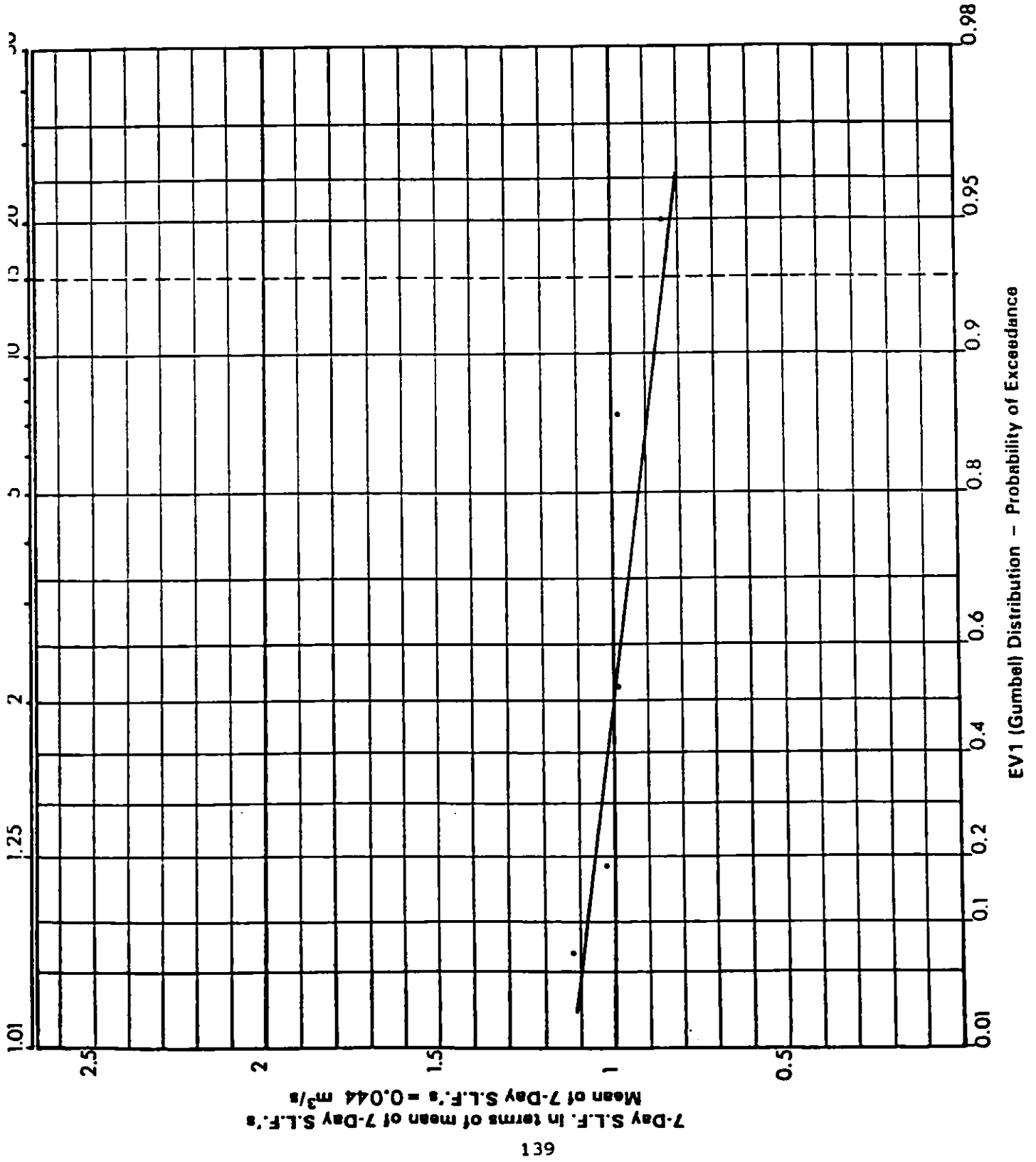
Year 1981 Only					
5%	0.28	30%	0.11	75%	0.05
10%	0.20	40%	0.09	80%	0.05
15%	0.17	50%	0.07	85%	0.05
20%	0.15	60%	0.06	90%	0.05
25%	0.13	70%	0.06	95%	0.05

** All flow rates above are in cubic metres per second. **



Data for 1976 for
Station No. 1019 VALLOMBROSA
is not available

Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 1019
R. BALLYMAN AT VALLOMBROSA
for period 1977 to 1987



STATION NO 1021

Sheet A

Shanganagh at Common's Road

Body Responsible: DUC

N. G. R.: 0 252 230

Catchment Area to Station: 30.9 sq km
 Long Average Rainfall [1941-1970]: 990 mm/yr

Data based on continuous water level records for the period :
 12-May-80 to 31-Dec-87

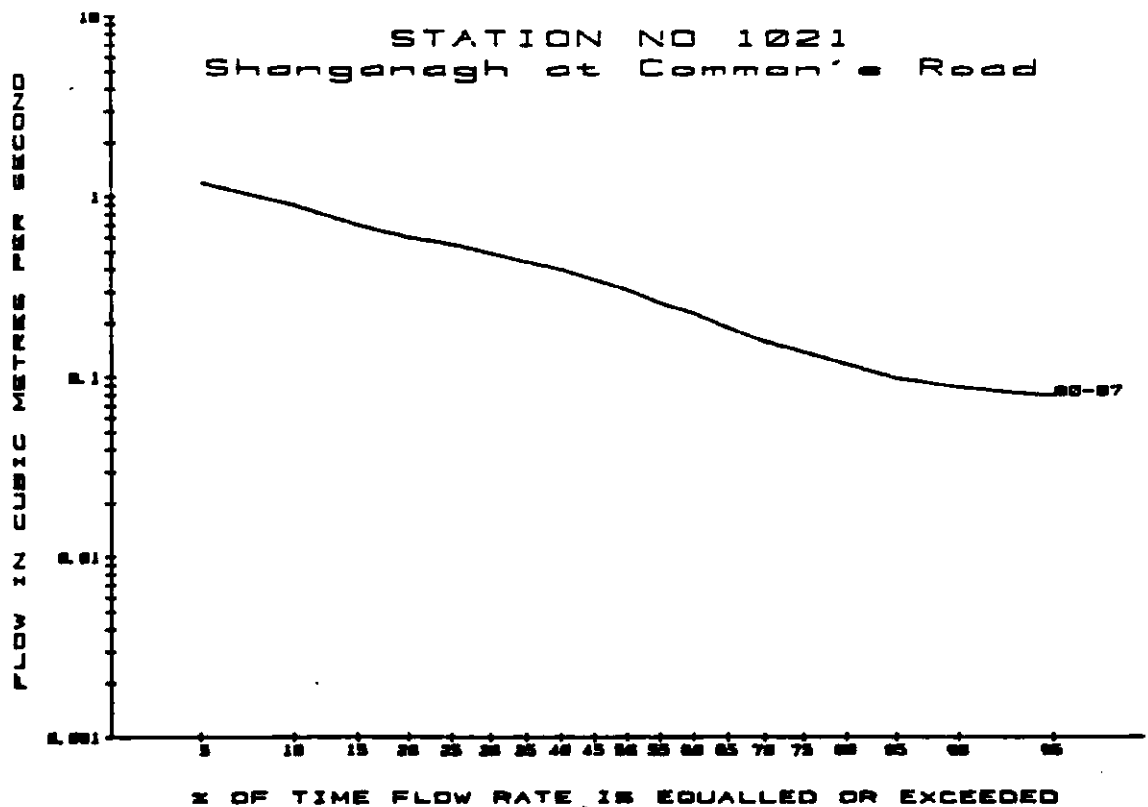
Mean Flow Rate: 0.45 [459 mm/yr rainfall on catchment]

Daily Mean Flows: minimum 0.050 on 29-Jul-84
 maximum 28.90 on 6-Nov-82

TABLE OF EXCEEDANCE PERCENTILES

		Full period			
5%	1.20	30%	0.49	75%	0.14
10%	0.90	40%	0.40	80%	0.12
15%	0.70	50%	0.31	95%	0.10
20%	0.60	60%	0.23	90%	0.09
25%	0.55	70%	0.16	95%	0.09

** All flow rates above are in cubic metres per second. **



STATION NO 1021

Sheet B

Shanganagh at Common's Road

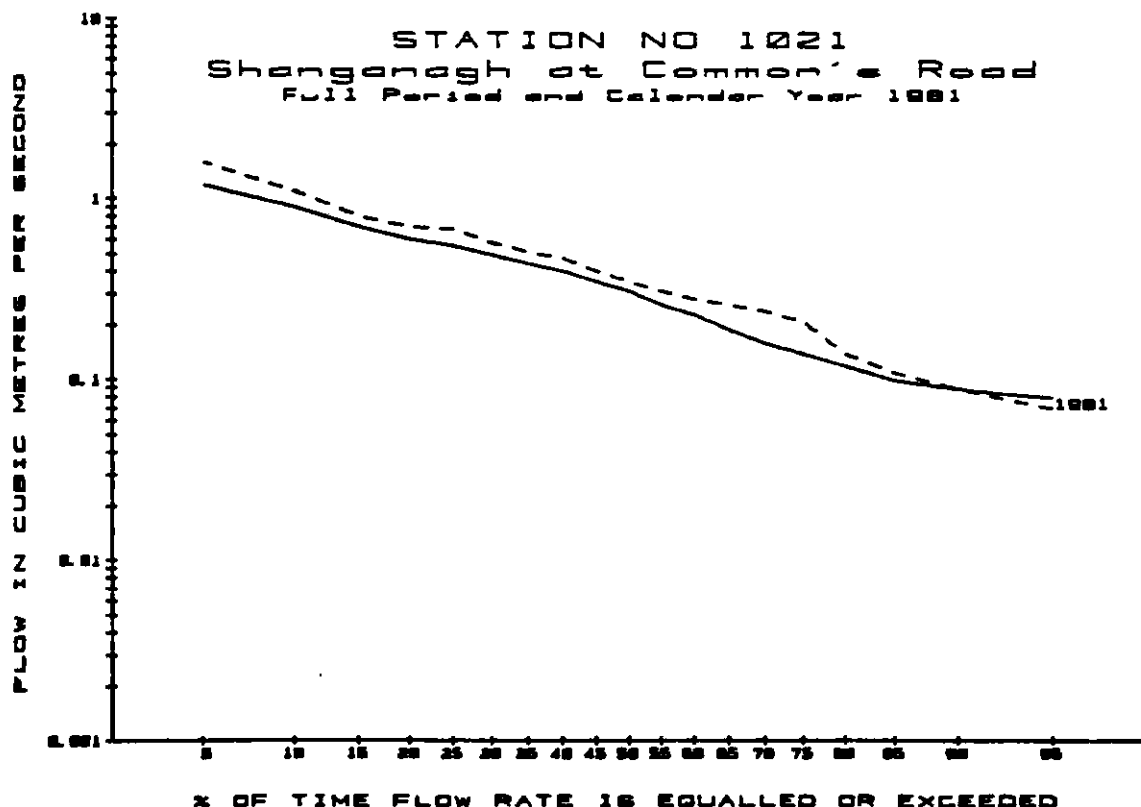
Data based on continuous water level records for the period :
12-May-80 to 31-Dec-87

PERIOD	SUSTAINED LOW FLOWS				DAYS
	3	7	15	30	
1981	0.057	0.070	0.07	0.09	
1980-1987	0.081	0.085	0.10	0.14	[Average]

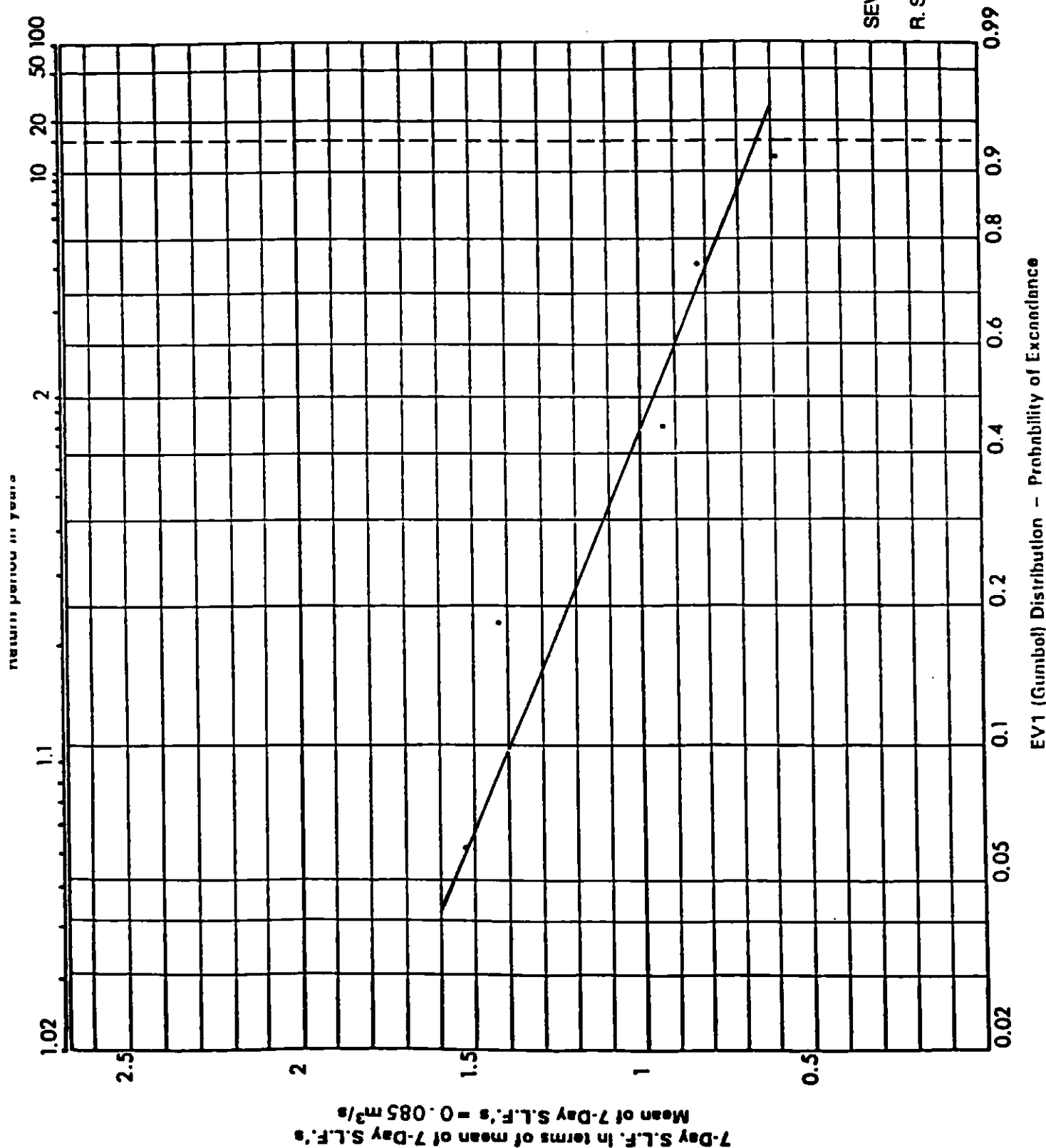
TABLE OF EXCEEDANCE PERCENTILES

Year 1981 Only					
5%	1.60	30%	0.57	75%	0.21
10%	1.10	40%	0.47	80%	0.14
15%	0.80	50%	0.35	95%	0.11
20%	0.70	60%	0.28	90%	0.09
25%	0.68	70%	0.24	95%	0.07

** All flow rates above are in cubic metres per second. **



Data for 1976 for
Station No. 1021 COMMON'S ROAD
is not available



Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 1021
R. SHANGANAGH AT COMMON'S ROAD
for period 1980 to 1987

EV1 (Gumbol) Distribution - Probability of Exceedance

STATION NO 1022

Sheet A

Cabinteeley at Carrickmines

Body Responsible: DUC

N.G.R.: D 234 242

Catchment Area to Station: 10.4 sq km
 Long Average Rainfall [1941-1970]: 990 mm/yr

Data based on continuous water level records for the period :
 1-Jan-82 to 31-Dec-87

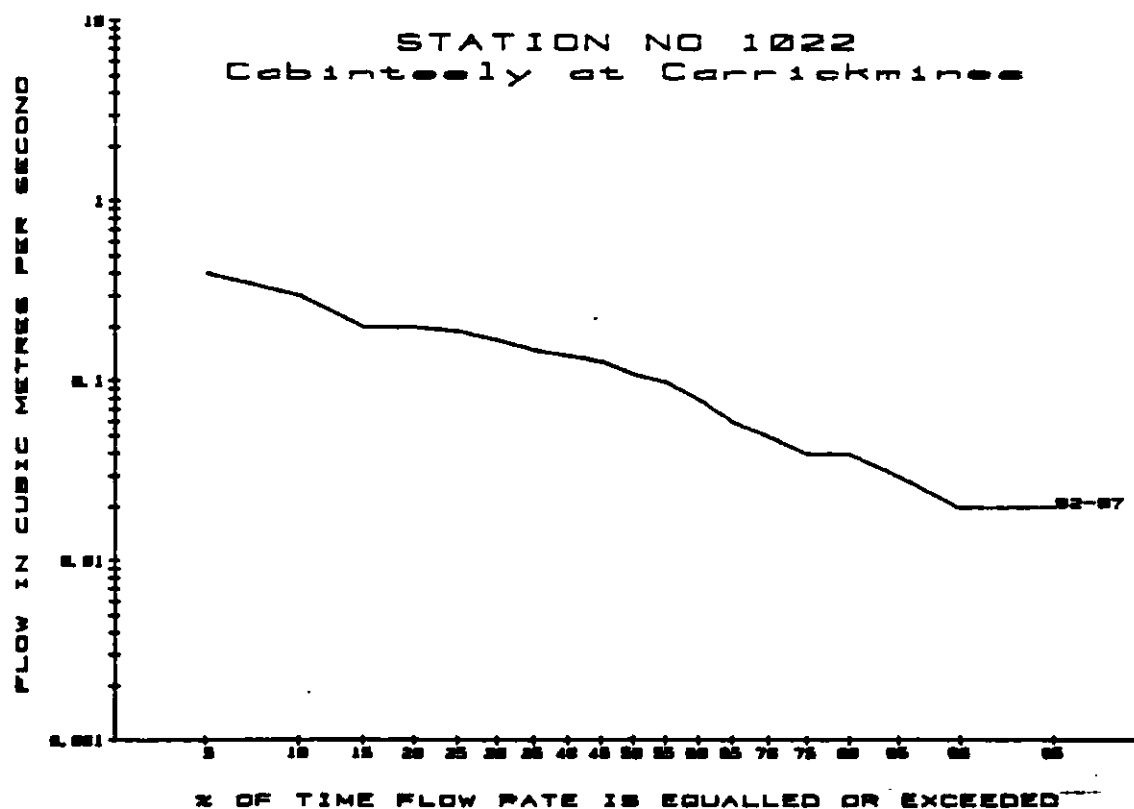
Mean Flow Rate: 0.15 [455 mm/yr rainfall on catchment]

Daily Mean Flows: minimum < 0.010 on 29-Jul-84
 maximum 4.70 on 6-Nov-82

TABLE OF EXCEEDANCE PERCENTILES

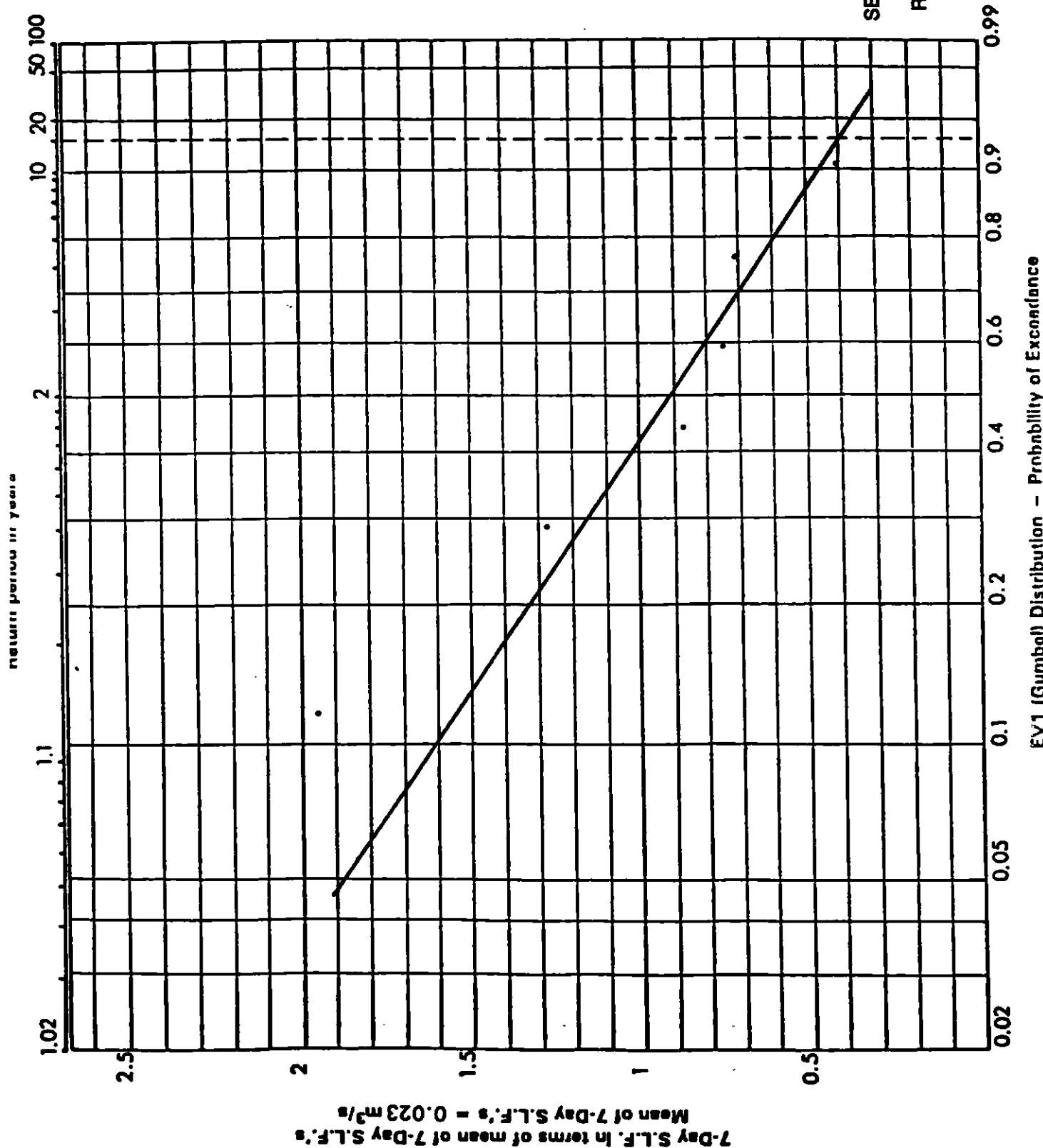
		Full period			
5%	0.40	30%	0.17	75%	0.04
10%	0.30	40%	0.14	80%	0.04
15%	0.20	50%	0.11	85%	0.03
20%	0.20	60%	0.08	90%	0.02
25%	0.19	70%	0.05	95%	0.02

** All flow rates above are in cubic metres per second. **



Data for 1981 for
Station No. 1022 CARRICKMINES
is not available

Data for 1976 for
Station No. 1022 CARRICKMINES
is not available



Distribution of
SEVEN-DAY SUSTAINED LOW FLOWS
at Station No. 1022
R. CABINTEELY AT CARRICKMINES
for period 1982 to 1987.

STATION NO 1024

Sheet A

Glencullen at Glencullen Br.

Body Responsible: DUC

N. G. R.: 0 192 194

Catchment Area to Station: 13.8 sq km
Long Average Rainfall [1941-1970]: 1290 mm/yr

Data based on continuous water level records for the period :
23-Jun-82 to 31-Dec-85

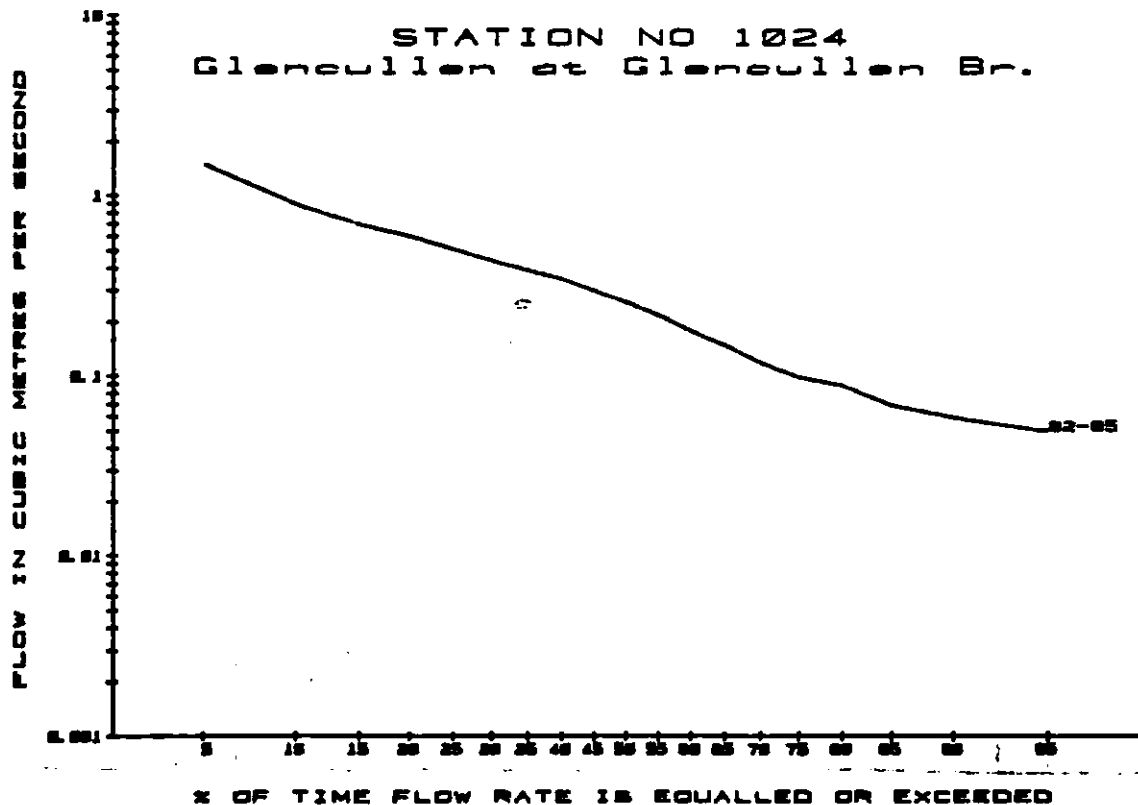
Mean Flow Rate: 0.46 [1049 mm/yr rainfall on catchment]

Daily Mean Flows: minimum 0.041 on 14-Aug-83
maximum 13.16 on 6-Nov-82

TABLE OF EXCEEDANCE PERCENTILES

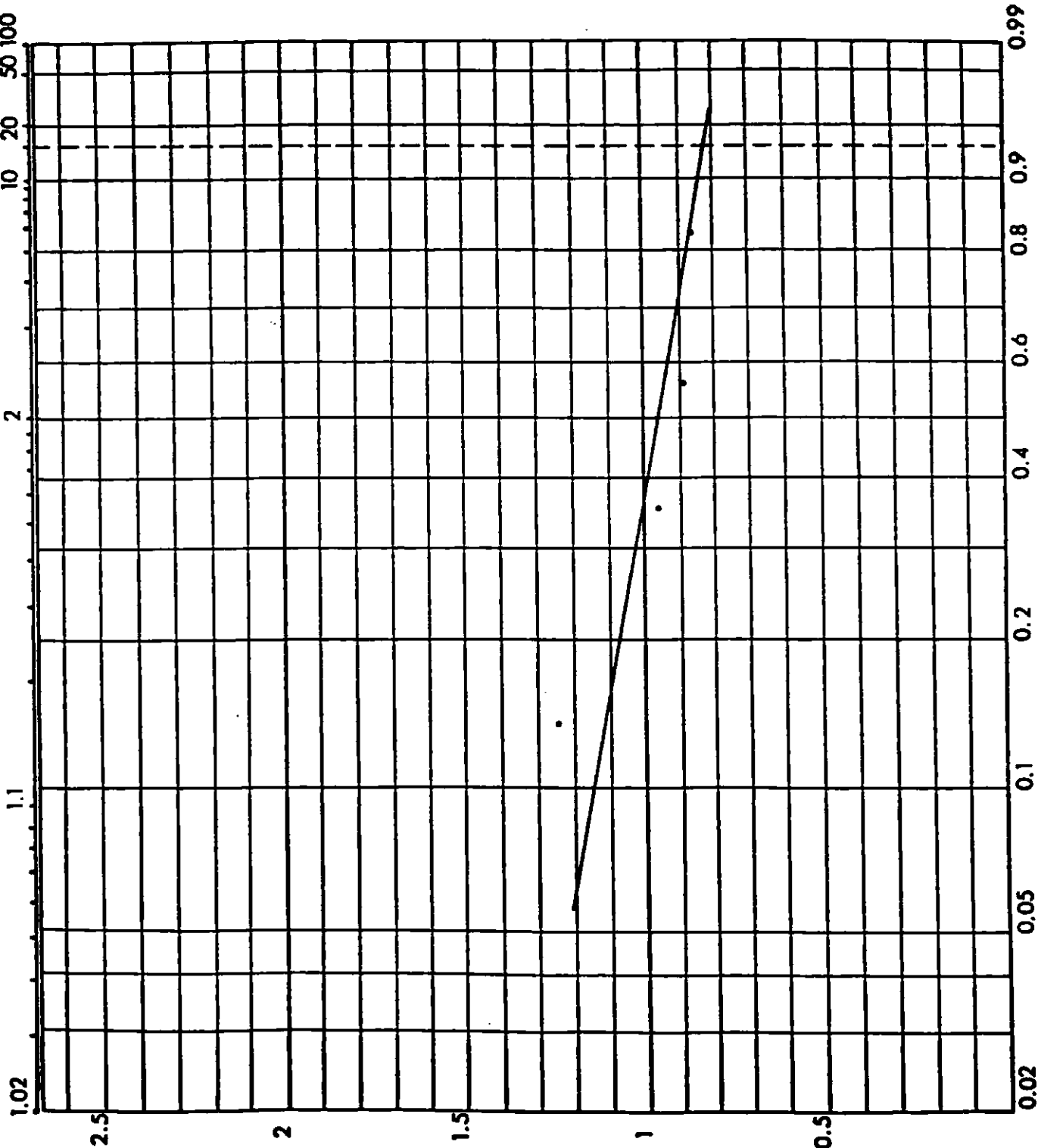
		Full period			
5%	1.50	30%	0.44	75%	0.10
10%	0.90	40%	0.35	80%	0.09
15%	0.70	50%	0.26	85%	0.07
20%	0.60	60%	0.18	90%	0.06
25%	0.51	70%	0.12	95%	0.05

** All flow rates above are in cubic metres per second. **



Data for 1981 for
Station No. 1024 GLENCULLEN
is not available

Data for 1976 for
Station No. 1024 GLENCULLEN
is not available



Distribution of
SEVEN-DAY SUSTAINED FLOWS
at Station No. 1024
R. GLENCULLEN AT GLENCULLEN
for period 1982 to 1985.

EV1 (Gumbel) Distribution - Probability of Exceedance

APPENDICES

APPENDIX 1

HYDROMETRIC AREAS IN IRELAND

- | | | |
|-----|----------------------------|---|
| 01 | Foyle | The surface catchment drained by the River Foyle and by all streams entering tidal water between Culmore Point, Co. Derry and Coolkeeragh, Co. Derry. |
| 02 | Faughan-Roe | The surface catchment drained by the Rivers Faughan and Roe and by all streams entering tidal water between Coolkeeragh and The Barmouth, Co. Derry. |
| 03 | Bann | The surface catchment drained by the River Bann and by all streams entering tidal water between The Barmouth and Ballyaghan Point, Co. Derry. |
| 04 | Bush and NE Streams | The surface catchment drained by the River Bush and by all streams entering tidal water between Ballyaghan Point and Curran Point, Co. Antrim. |
| 05 | Lagan-Quoile | The surface catchment drained by the Rivers Lagan and Quoile and by all streams entering tidal water between Curran Point and Murlough Upper, Co. Down. |
| 06 | Newry, Fane, Glyde and Dee | The surface catchment drained by the Rivers Newry, Fane, Glyde and Dee and by all streams entering tidal water between Murlough Upper and The Haven, Co. Louth. |
| 07 | Boyne | The surface catchment drained by the River Boyne and by all streams entering tidal water between The Haven and Mornington Point, Co. Meath. |
| 08 | Nanny-Delvin | The surface catchment drained by the rivers Nanny and Delvin and by all streams entering tidal water between Mornington Point and Sea Mount, Co. Dublin. |
| 09 | Liffey and Dublin Bay | The surface catchment drained by the River Liffey and by all streams entering tidal water between Sea Mount and Sorrento Point, Co. Dublin. |
| 10 | Ovoca-Vartry | The surface catchment drained by the Rivers Ovoca and Vartry and by all streams entering tidal water between Sorrento Point and Kilmichael Point, Co. Wexford. |
| 11. | Owenavorrhagh | The surface catchment drained by the River Owenavorrhagh and by all streams entering tidal water between Kilmichael Point and the Raven Point, Co. Wexford. |
| 12 | Slaney and Wexford Harbour | The surface catchment drained by the River Slaney and all streams entering tidal water between the Raven Point and Greenore Point, Co. Wexford. |

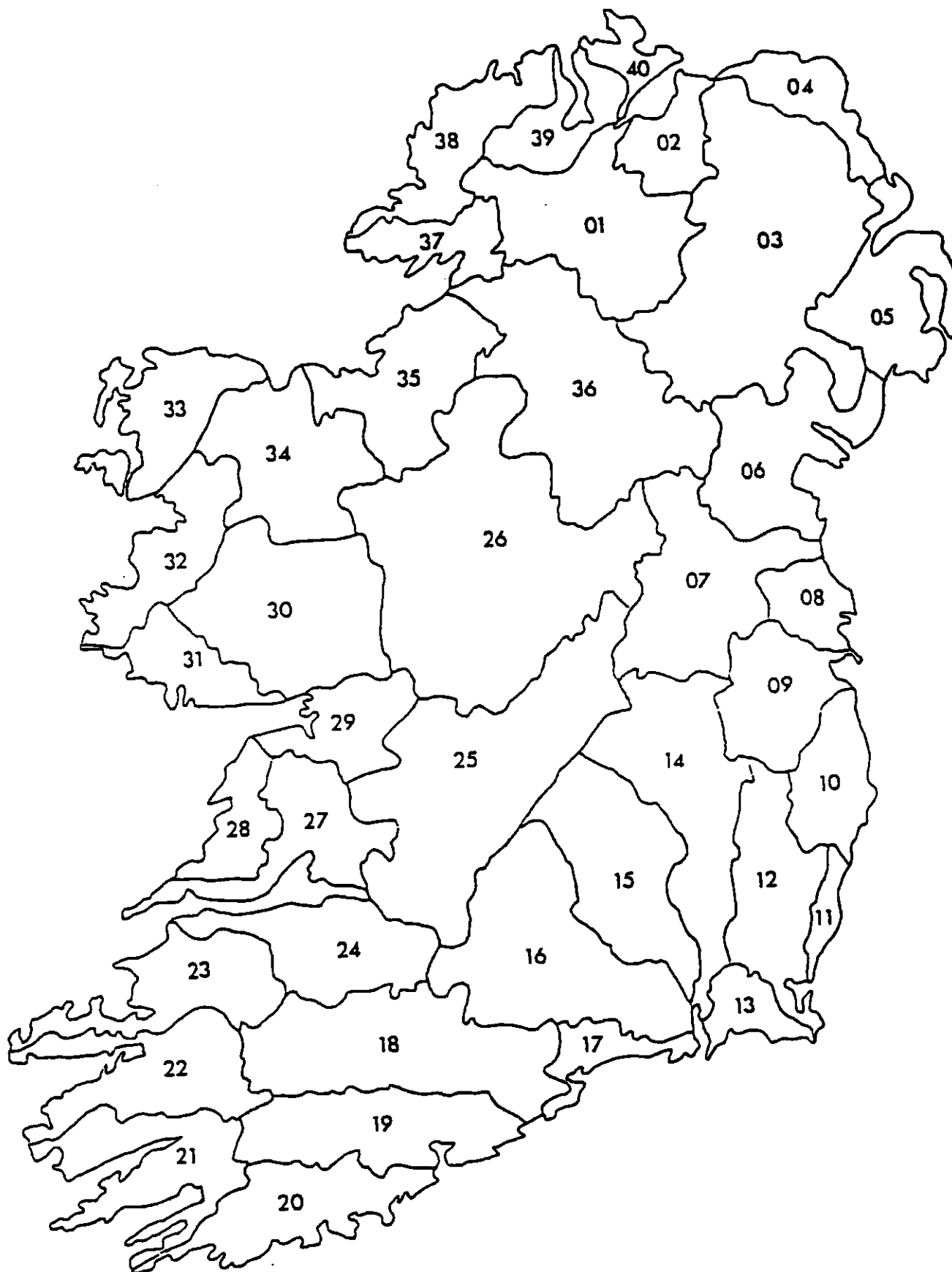


Fig. 4 Hydrometric Areas of Ireland.

- | | | |
|----|-----------------------------------|--|
| 13 | Ballyteigue-Bannow | The surface catchment drained by all streams entering tidal water between Greenore Point and Railway Bridge, Great Island, Co. Wexford. |
| 14 | Barrow | The surface catchment drained by the River Barrow upstream of the River Nore confluence and all streams entering tidal water between the Barrow railway bridge at Great Island and Ringwood, Co. Kilkenny. |
| 15 | Nore | The surface catchment drained by the River Nore and all streams entering tidal water between its confluence with the River Barrow at Ringwood and the Barrow railway bridge at Drumdowney, Co. Kilkenny. |
| 16 | Suir | The surface catchment drained by the River Suir and all streams entering tidal water between Drumdowney and Cheekpoint, Co. Waterford. |
| 17 | Colligan-Mahon | The surface catchment drained by the Rivers Colligan and Mahon and all streams entering tidal water between Cheekpoint and East Point, Co. Waterford. |
| 18 | Blackwater (Munster) | The surface catchment drained by the River Blackwater and all streams entering tidal water between East Point and Knockaverry, Youghal, Co. Cork. |
| 19 | Lee, Cork Harbour and Youghal Bay | The surface catchment drained by the River Lee and all streams entering tidal water in Cork Harbour and Youghal Bay and between Knockaverry and Templebreedy Battery, Co. Cork. |
| 20 | Bandon-Ilen | The surface catchment drained by the Rivers Bandon and Ilen and all streams entering tidal water between Templebreedy Battery and Mizen Head, Co. Cork. |
| 21 | Dunmanus-Maine-Dingle Bay | The surface catchment drained by all streams entering tidal water in Dunmanus, Bantry and Kenmare Bays between Mizen Head and Glanearagh Head, Co. Kerry. |
| 22 | Laune-Maine-Dingle Bay | The surface catchment drained by the Rivers Laune and Maine and all streams entering tidal water between Glanearagh Head and Clogher Head, Co. Kerry. |
| 23 | Tralee Bay-Feale | The surface catchment drained by the River Feale and all streams entering tidal water in Tralee Bay and between Clogher Head and Kilconly Point, Co. Kerry. |
| 24 | Shannon Estuary South | The surface catchment drained by the Rivers Deel and Mague and all streams entering tidal water in the Shannon Estuary between Kilconly Point and Thomond Bridge, Limerick. |

- | | | |
|----|-----------------------|--|
| 25 | Lower Shannon | The surface catchment drained by the River Shannon and all tributary streams entering it between Thomond Bridge and its confluence with the River Suck between Shannonbridge, Co. Offaly and Clonfert, Co. Galway. |
| 26 | Upper Shannon | The surface catchment drained by the Rivers Shannon and Suck and all tributary streams upstream of their confluence between Shannonbridge and Clonfert. |
| 27 | Shannon Estuary North | The surface catchment drained by the River Fergus and all streams entering tidal water between Thomond Bridge and George's Head, Co. Clare. |
| 28 | Mal Bay | The surface catchment drained by all streams entering tidal water in Mal Bay and between George's Head and Black Head, Co. Clare. |
| 29 | Galway Bay South East | The surface catchment drained by all streams entering tidal water in Galway Bay between Black Head and Renmore Point, Galway. |
| 30 | Corrib | The surface catchment drained by the River Corrib and all streams entering tidal water between Renmore Point and Nimmo's Pier, Galway. |
| 31 | Galway Bay North | The surface catchment drained by all streams entering tidal water between Nimmo's Pier and Slyne Head, Co. Galway. |
| 32 | Erriff-Clew Bay | The surface catchment drained by the River Erriff and all streams entering tidal water between Slyne Head and Corraun Point, Co. Mayo. |
| 33 | Blacksod-Broadhaven | The surface catchment drained by all streams entering tidal water in Blacksod and Broadhaven Bays and between Corraun Point and Benwee Head, Co. Mayo. |
| 34 | Moy and Killala Bay | The surface catchment drained by the River Moy and all streams entering tidal water in Killala Bay between Benwee Head and Lenadoon Point, Co. Sligo. |
| 35 | Sligo Bay and Drowes | The surface catchment drained by the River Drowes and all streams entering tidal water in Sligo Bay and between Lenadoon Point and Aughrus Point, Co. Donegal. |
| 36 | Erne | The surface catchment drained by the River Erne and all streams entering tidal water between Aughrus Point and Kildoney Point, Co. Donegal. |
| 37 | Donegal Bay North | The surface catchment drained by all streams entering tidal water between Kildoney Point and Rossan Point, Co. Donegal. |

- | | | |
|----|----------------------|--|
| 38 | Gweebarra-Sheephaven | The surface catchment drained by all streams entering tidal water in Gweebarra River, Sheephaven Bay and between Rossan Point and Fanad Head, Co. Donegal. |
| 39 | Lough Swilly | The surface catchment drained by all streams entering tidal water in Lough Swilly between Fanad Head and Dunaff Head, Co. Donegal. |
| 40 | Donagh-Moville | The surface catchment drained by the River Donagh and all streams entering tidal water between Dunaff Head and Culmore Point, Co. Derry. |

APPENDIX 2

REFERENCES

1. Statistical Analysis of River Flows - The South Eastern Water Resources Region. Water Resources Division, An Foras Forbartha, 1984.
2. MacCárthaigh, M., Statistical Analysis of River Flows - The Southern Water Resources Region. Water Resources Division, An Foras Forbartha, 1987.
3. Memorandum No. 1 Water Quality Guidelines. Technical Committee on Effluent and Water Quality Guidelines, Stationery Office, 1978.
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5. Gringorten, I.I., 1963. A Plotting Rule for Extreme Probability Paper. J. Geophys. Res., 68 (3) : 813-814.
6. Hydrology in Ireland. Irish National Committee, International Hydrological Programme, 1982.
7. Summary of Hydrometric Records - The Eastern Water Resource Region. Water Resources Division, An Foras Forbartha, 1977.
8. 1984 Drought River Flows - A Comparison with other years. Water Resources Division, An Foras Forbartha, 1984.

