ENVIRONMENTAL PROTECTION

NRA

National Rivers Authority
South West Region

MICRO LOW FLOWS AVERAGE AND LOW FLOW ESTIMATION IN THE S.W. REGION VALIDATION OF VERSION 1.1 SOFTWARE

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WR/91/2
Water Resources

GORDON H BIELBY BSc
Regional General Manager

C V M Davies
Environmental Protection
Manager

TEST TEAM (NRA)

Water Resources Planning

Dr. Robert Grew - Water Resources Hydrologist

Jennifer Tilley - Assistant Water Resources Hydrologist

Anita Higgins - Technical Assistant

Natasha Fellowes - Water Resources Assistant

Information Technology

Dr. Neil Murdoch - Modelling Officer

Consultee

Dr. Janet Cochrane - Water Resources Planning Officer

List of Symbols and Abbreviations

AAY - Average Annual Yield
ADFMAP - the natural mean daily flow at the same location as compensation flows
ADFREC - recorded daily flow at the dam or maintained flow point
AE - Actual Evaporation
C.A - Catchment Area
cumecs - metres cubed per second
COMPCODE - the compensation code categorising the type of release policy operated
GHOST - Grouped Hydrology Of Soil Types
HOST - Hydrology Of Soil Types
HYA - Hydrometric Area
IH - Institute of Hydrology
km^2 - square kilometres
LID - Line Identification Number
MF - Mean Flow
MLFs - Micro Low Flows
mm - millimetres
MSDOS - MicroSoft Disk Operating System
NGR - National Grid Reference
NRA SW - National Rivers Authority South West
PCDOS - Personal Computer Disk Operating System
PE - Potential Evaporation
Q50(10) - 50 percentile exceedance (median) flow of 10 day duration
Q50(1) - 50 percentile exceedance (median) flow of 1 day duration
Q95(10) - 95 percentile exceedance flow of 10 day duration
Q95(1) - 95 percentile exceedance flow of 1 day duration
r - Adjustment factor for the estimation of actual evaporation
SAAR - Standard period (1941 - 1970) Average Annual Rainfall
SGL - Simple Graphics Library

SUMMARY

Micro Low Flows is a computer based software system for estimating theoretical flow statistics for individual river reaches. Version 1.1 was purchased from the Institute of Hydrology on March 18th 1991 and has been subject to a series of tests designed to identify errors, limitations and possible improvements.

Serious errors included inaccuracies in the calculation of flow statistics and the failure of the system during plotting due to more than a preset number of files being open at any one time. These problems should be corrected in version 1.2.

It is hoped that several of the recommendations outlined in section 6 of this document will be incorporated into versions 1.2 and 1.3.

Overall, the system is relatively easy to use and will improve the support provided by Water Resources Planning to achieve various corporate targets.

Contents

1 Introduction

The responsibilities of the Water Resources Planning Section include the development of databases and techniques to support water resources studies, the provision of hydrological support to the Abstraction Licensing and Protection and Investigation sections and the provision of basic hydrological advice to other functions.

Flow is monitored on only a small proportion of the regions river reaches. Consequently, the theoretical flow data provided by Water Resources Planning is regularly used throughout the Authority to help meet a range of corporate objectives.

The Micro Low Flows system (MLFs) is a PC based software package for the rapid and repeatable estimation of theoretical flow statistics for individual river reaches.

MLFs has been developed by the Institute of Hydrology (IH), (Bullock and Gustard (1989) and Bullock, Gustard and Sekulin (1990)) and purchased by NRA SW. Beta Version 1.1 was supplied to NRA SW on 18/3/91. This report summarises the results of the testing of version 1.1. Beta Version 1.2 contains several additional features and is due 3 months after the receipt of Version 1.1. Version 1.3, containing any modifications arising from testing of the Beta releases is due 7 months after receipt of Version 1.1. NRA SW have formally undertaken to test and report on the Beta versions. A timetable of MLFs validation work is shown in Appendix 1.

NRA SW purchased Micro Low Flows to provide 'customers' with the most efficient and technically sound/acceptable service available.

2 Aim and Objectives of the Validation Study

2.1 Aim

To assess the performance of the software system, associated documentation and installation instructions and recommend developments of the software system for Release 1.2.

2.2 Objectives

a. To determine whether the MLFs system corresponds to that described in the document entitled "Purchase, Maintenance and Development Contract for Institute of Hydrology MICRO LOW FLOWS - NETWORK (Release 1.3) Software" (January 1991).

b. To identify errors and where possible determine their cause.

c. To identify the limits of the software system.

d. To determine whether the P.C system is an improvement upon the initial system using overlay maps and tables.

e. To report to IH all errors encountered; limitations of and possible improvements to the system.

3 Attributes of the Micro Low Flows Network Software System

In the "Purchase, Maintenance and Development Contract", IH undertakes to supply MLFs Version 1.1 with the following content, retrieval, output facilities, documentation and software. The hardware was supplied by NRA SW.

3.1 Data Base Content

The data base should contain catchment characteristics (catchment area, SAAR, PE and GHOST values) and flow statistics (MF, Q95(1), Q50(1) in cumecs) for 14,000 river stretches in the South West of England.

3.2 Data Base Retrieval System

The data base retrieval system based on a menu structure, should have the following facilities:

- error detection
- context sensitive help facility
- memo pad

River networks may be accessed using the following menu options:

- gauging station
- NGR
- LID
- river name

Identified sites should have the following data presented:

- NGR
- LID
- catchment area (km^2)
- SAAR (mm)
- PE (mm)
- GHOST (% of MF)
- MF (cumecs)
- Q95 (1) (cumecs)
- Q50 (1) (cumecs)

Flow statistics are to be given in cumecs to three decimal places.

In addition it should be possible to list data values for river stretches upstream of a site. It should also be possible to retrieve the following gauging station data and reservoir information when choosing reaches with either of these features:

- gauging station number
- NGR
- start and end year of flow record
- area
- ADF
- Q95
- Q50
- reservoir number
- NGR
- type (primary function)
- date of impoundment
- total area
- natural yield (net yield after provision for compensation flow)
- compensation flow
- net capacity
- COMPCODE (the compensation code categorising the type of release policy operated)
- ADFMAP (the natural mean daily flow at the same location as compensation flows)
- natural area
- gross capacity
- ADFREC (recorded daily flow at the dam or maintained flow point)

Presentation of the selected river stretch should include the upstream network.

A zoom-in/out facility should be available.

Other facilities include text labelling, display of river stretch data next to the network and alternatively, a memo pad display.

3.3 Output Facilities

Output facilities include screen display of river network and associated data. Hard copies should be obtainable from a HP7475 plotter, EPSON printer and HP Laserjet II printer. It should be possible to obtain copies of the screen image on any printer which is compatible with the computer hardware.

3.4 Documentation

Documentation is to be supplied by IH - 5 copies of Technical Guide and User Guide to MLFs.

a) Technical Guide
The Technical Guide should include an outline of the methodology used to calculate flow statistics, data sources used by the software and a summary of

validation studies undertaken by IH prior to the release of Beta Version 1.1.

b) User Guide
The User Guide should include a tree diagram of the menu structure, a worked example and guidance on parameters to which the model is sensitive.

3.5 Software and Hardware Standards.

MLFs software should be written in FORTRAN 77, use a Simple Graphics Library (SGL) and operate on MS DOS 3.3 and PC DOS 3.3. Panel Plus II should be included by IH for menu handling. MLFs programs should be executable on IBM PC/ PS/2 '286', '386', '486' based and compatible machines and Microsoft mouse to PS/2 port.

4 Validation Methodology

Essentially, validation is necessary to confirm that the MLFs system corresponds to that described in the contract document, to identify errors and to provide the basis for future improvements.

Software testing can take several forms including module or unit testing, integration testing, function testing, performance testing and closed box testing. The choice of test depends on the number of logical paths, the nature of the input data/instructions, the amount of computation involved and the complexity of the algorithms.

A systematic testing scheme, using integrated (ie, how components work together) and unit tests was devised for MLFs. Integrated tests, based on hydrometric areas 45-51, (HYA 45-51) (see Appendix 2) were mainly designed to test the menu structure, notepad and print facilities (tests 1-5). Unit tests were also devised to test elements of MLFs including its content and retrieval facilities (tests 6-9). The details of each test, including the key strokes involved were carefully designed and documented. These details are shown in Appendix 3 and Appendix 4.

A random or unscheduled testing element was also added to the testing program. It was designed without the rigid instructions of the systematic tests and allowed for free movement throughout the system. Menu paths and key strokes were documented as the test progressed.

Test Number	Subject of test
1,2,3,4,5,6	data base content
1,2,3,4,6,8,9	data base retrieval
1,2,3,4,7	output facilities

Summary of the purpose of tests 2-9. (see Appendix 3 and 4).

Once tests 2-9 inclusive were complete tests 2 and 3 were repeated using different river names.

The documentation (Technical Guide and User Guide) was checked for accuracy and then assessed as an aid for the inexperienced user, someone who had no previous experience of the system (Natasha Fellowes).

The software and hardware standards and requirements were checked against those stated in the contract.

5. Results

The results of tests where no errors were encountered were recorded on comment sheets and are documented separately (available on request from Water Resources Planning).

5.1 Attributes

The system contains all the content, retrieval, output facilities, documentation and software as outlined in the Contract (available on request from Water Resources Planning).

5.2 Errors

An error is defined as any 'failure' of the system to match the users expectations. This includes serious errors such as those that cause 'crashing' or 'looping' as well as minor omissions and suggested changes to the menu access. NRA SW have undertaken to give IH a precise written description of errors in the Beta version of Micro Low Flows. IH have undertaken to correct these errors within one month.

All errors identified during testing (except those associated with the documentation) were classified (A-F) according to their impact on the use of MLFs. The basis of the error classification scheme is outlined in Appendix 5 and an example of an error reporting form is shown in Appendix 6. A comment sheet, Appendix 7, has also been used to record details of each test including further information on previously identified errors. Errors have been documented and reported to IH on two occasions - 25/4/91 and 7/5/91.

5.2.1 Data Base Content Errors

a. GHOST values (Q95(10)) >0.35 have not been set to 0.35, the maximum likely observed value. Also a problem with the maps and tables. See Appendix 8.

b. The listings of river names is incomplete. See Appendix 9.

c. The response "n.a" (not applicable/available) for Q95 when GHOST is zero

should read 0.000 as in the overlay maps and tables. See Appendix 10.

d. Q50s calculated incorrectly, overestimated. Also a problem with the maps and tables. See Appendix 11.

e. The river names menu includes an option for the River Lim. This catchment is in Hydrometric Area 44 which is not in the SW region. No data is held for these reaches, its presence is misleading. See Appendix 12.

f. Other errors in the maps and tables, previously reported to IH, were also found in MLFs (test 5). See Appendix 13.

5.2.2 Data Base Retrieval Errors

a. An error associated with accessing the data files caused the system to become inoperable. This error occurred when more than a certain number of files had been accessed. 'Too many open files' problem was consistently reproduced.
Symptoms of the problem included the plotter stopping before completing the plot, failure of the menu to reappear on the screen and the need to reboot the system. See Appendix 14.

b. Incorrect entry by NGR. Test 2 was designed to compare the results of

i) river name

ii) LID

iii) NGR entry

This test produced inconsistent results. The NGR produced by MLFs for i) river name and ii) LID entry was used for iii) NGR entry. However, despite using the same NGR, MLFs identified a different river stretch. Examples were found on the Rivers Sid (HYA45), Branscombe (HYA50) and Tamar/Tavy (HYA47). See Appendix 15.

c. Ermington Gauging Station (HYA46) is displayed between two river stretches and the associated information could only be accessed by selecting the upstream section of the northern-reach. See Appendix 16.

d. When entering MLFs by river name in HYA51, it is not possible to return to the first page of river names from the second page. "LID not found - serious error" is shown on the screen. See Appendix 17.

e. The notepad does not have a wraparound facility which results in words being split at the end of the line. Also, the 'insert text' facility needs adjustment to prevent text from being 'pushed out of view' instead of onto the next line. See Appendix 18.

f. The NGR menu face is incomplete. It reads igit "Easting", instead of "4 digit Easting". See Appendix 19.

5.2.3 Output Facilities Errors

a. Hard copies of catchment/flow data for reaches upstream of a designated stretch have the top 2 title lines missing.

5.3 Documentation

Five copies of a Technical Guide and a User Guide were supplied by IH.

a) Technical Guide

This includes a list of contents, an outline of the scientific methodology used in calculating the flow statistics, the data sources used by the software and a summary of the validation studies performed.

When calculating Mean Flow the product of Average Annual Yield and Catchment Area should then be divided by 31536 (the denominator in the MF equation: MF = AAY(mm) * AREA(km^2) /31536) and not 31525 as stated in the Technical Guide.

In the list of symbols and abbreviations, "HOST" is listed twice and "r", the adjustment factor for the estimation of actual evaporation, is missing.

The summary of validation studies performed shows a table of flow statistics (Figure 5.1) for sample river reaches. For LID 228 Micro Low Flows estimates Q50 to be 0.643 cumecs not 0.691 cumecs as stated in Figure 5.1. Other Q50s in Figure 5.1 are also incorrect.

b) User Guide

This User Guide has been designed for version 1.1 of Micro Low Flows. The title should reflect this.

The guide states that there is a two to three second pause while the data for a hydrometric area is loaded, in practice the delay is somewhat longer.

Abstractions, discharges and spot gaugings are not marked on the river network.

The menu tree (Figure 2.1) is useful but will need updating to include the extra facilities in later versions of the software.

The worked example is useful and easy to follow. However in step 7 it states that a line of text can be added to the gauging station information. This is not a facility of version 1.1.

The User Guide should define an official backup procedure. The User Guide should be updated for version 1.2 and 1.3 of the Micro Low Flows software.

5.4 Software and Hardware Standards

The required software and hardware standards were specified in the MLFs contract in sections 1.3 and 1.4 respectively and in section 3.5 of this document. The extent to which these have been verified is summarised in the table below.

Requirement	Comment
1. Source Code - FORTRAN77	It is confirmed that the flow statistics algorithm routine, supplied in the Technical Guide is written in FORTRAN77.
2. Graphics Language	It is not possible to confirm that this is SGL.
3. Operating System	It is confirmed that the software executes under PC DOS 3.3
4. Menus	The menus appear to have been written using Panel Plus as required.
5. Machine	It is confirmed that the programs execute on a 386 machine. They have not been tested on a 286 or 486 platform.
6. Hardcopy	Tabular output on The HPLASERJET 2 was obtained. Graphics output was produced on the HPLASERJET 2 and HP7475 plotter.

Summary of Software and Hardware Requirements and Testing Results.

The mechanism for error correction was described in the Contract. The NRA undertook to report errors to IH. This has been done in previous correspondence and in this document (section 5).

6 General Software Recommendations

a. A Booking Form option in menu 4, similar to the notepad, to record details including when the request was made, who made it, what information was required, what was supplied and when, would be useful. This information could be printed along with the flow statistics. It need not be stored on disk.

b. Possible Output Facility adjustments to improve the hardcopy presentation

of statistics include;

- highlighting different sections, either in bold or by boxing sections (e.g a border around the entire print out and a border around the notepad)

- removal of the decimal point from the 'rounded' rainfall and potential evaporation figures

- the addition of a zero in front of figures <1

- addition of % MF after GHOST

- changing the symbol that highlights the appropriate river stretch shown in black and white printouts of networks from a * to a 'solid symbol'

- preventing printed information associated with one river reach being split over two pages.

c. It would be useful if the 'plot' output facility (HP or Laserjet) printed the notepad. See Appendix 20.

7 Conclusions

Essentially the system works reasonably well and represents an improvement over the maps and tables previously used to provide theoretical flow information. It is important that all A and B errors are corrected before Version 1.2 is installed and that most C errors are corrected prior to the release of Version 1.3. IH have already corrected, or agreed to correct, most A-C errors.

Phase 1 of MLFs testing is now complete. Phase 2 will begin after the release of Version 1.2 (see timetable, Appendix 1).

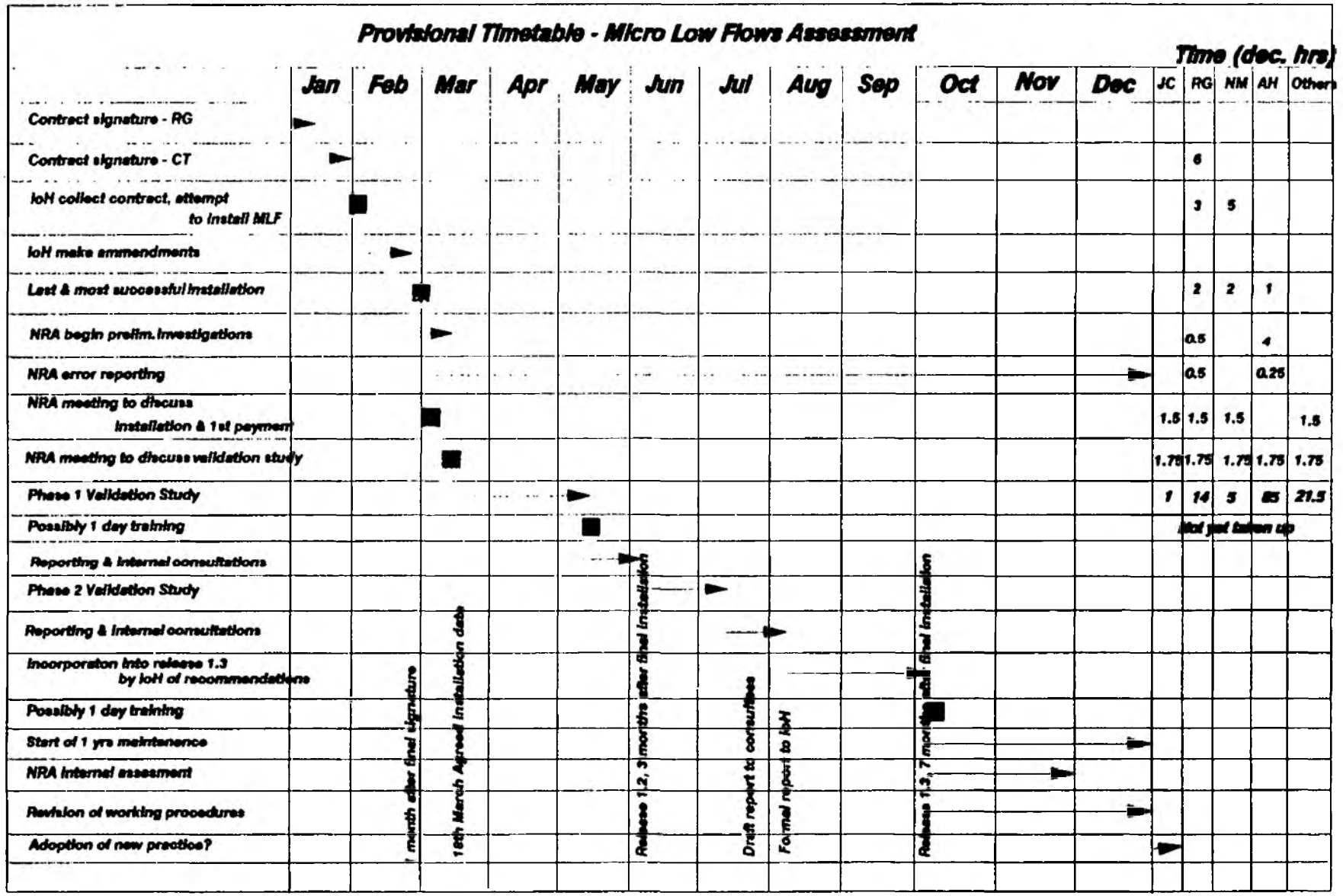
References

Bullock, A. and Gustard, A. (1989). "Average and Low Flow Estimation in the South West Region."

Bullock, A., Gustard, A. and Sekulin, A.E. (1990). "Supplement to Average and Low Flow Estimation in the South West Region - estimates for 14000 river stretches."

Appendix 1

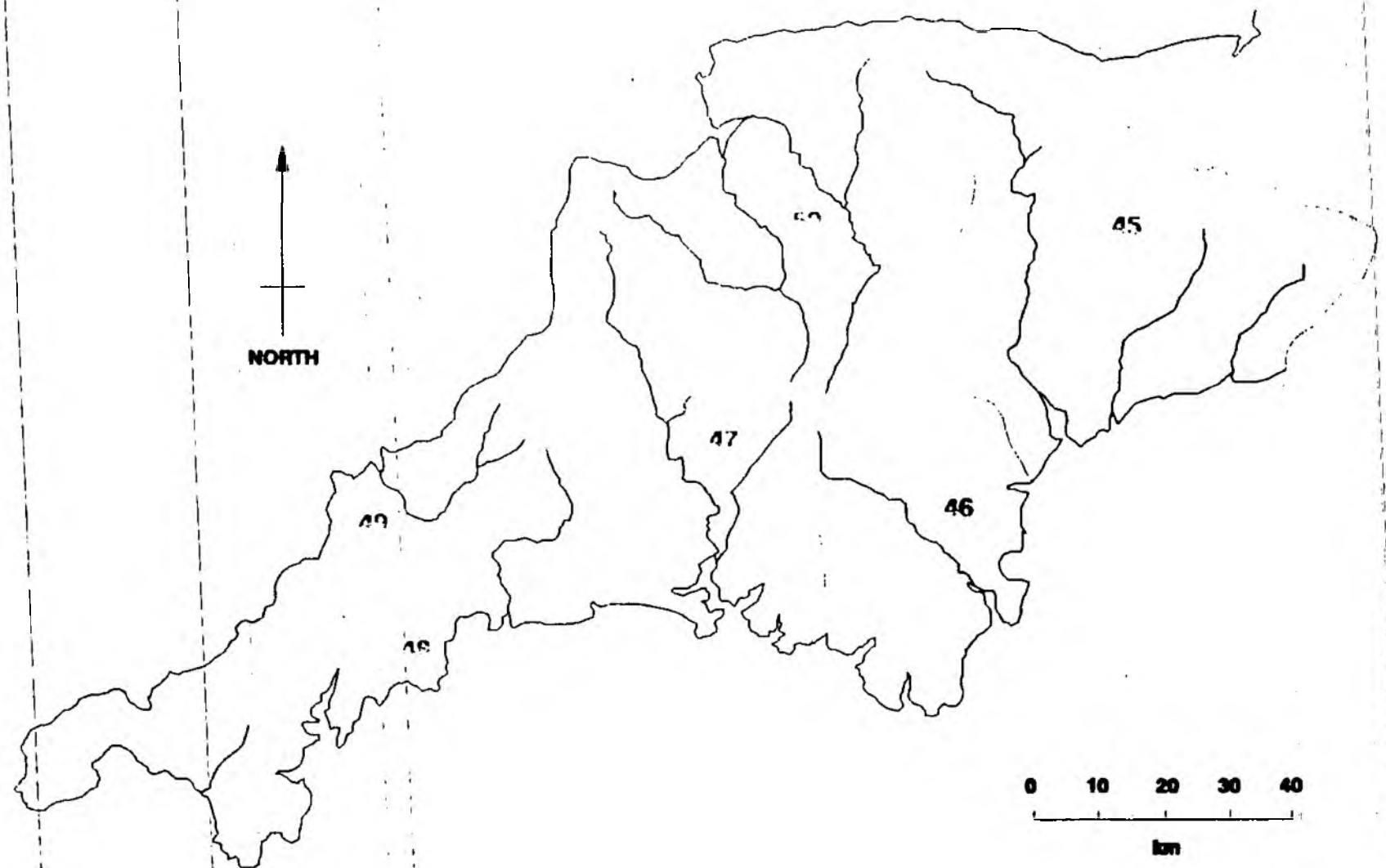
Provisional Timetable - Micro Low Flows Assessment



AH 25/6/91

Appendix 2

HYDROMETRIC AREAS OF THE SW REGION



APPENDIX 3

SCHEDULED TESTS

INTEGRATED TESTS PHASE 1

TEST NO.	PURPOSE	TESTER	DATE
1	To familiarise the user with the system and its main features.		

COMMENT

2a To test basic menu structure; river name entry, mouse and print facilities.

2b To test basic menu structure; LID entry and print facilities.

2c To test basic menu structure; NGR entry and print facilities.

Tests 2a -c are completed as a package using the same river reach. This package should be repeated for a reach in each hydrometric area.

	TESTER	DATE	COMMENT		TESTER	DATE	COMMENT
2a-cHYA45				2a-cHYA46			
2a-cHYA47				2a-cHYA48			
2a-cHYA49				2a-cHYA50			
2a-cHYA51							

---

3 To test data content; river name entry and the multiple print facility.

Test 3 should be repeated for a named river catchment in each hydrometric area. Compare the downloaded print with listings derived from the tables. Choose the Tavy in hydrometric area 47 and smaller named rivers in the other areas.

	TESTER	DATE	COMMENT		TESTER	DATE	COMMENT
3HYA45				3HYA46			
3HYA47				3HYA48			
3HYA49				3HYA50			
3HY51							

4a To test data content; the notepad and print facilities. Use river name and mouse to identify reach.

4b To test notepad recall and printing facilities. Use LID to identify reach used in 4a.

4c To retest notepad recall and printing facilities. Use NGR to identify reach used in 4a.

4d To test notepad editing facilities. Repeat 4b and c editing the notepad prior to printing.

Tests 4a-d are completed as a package using the same river reach. The package is completed in each hydrometric area. Are the printed notepads identical to those shown on the screen? Has the information been saved correctly?

	TESTER	DATE	COMMENT		TESTER	DATE	COMMENT
4a-dHYA45				4a-dHYA46			
4a-dHYA47				4a-dHYA48			
4a-dHYA49				4a-dHYA50			
4a-dHYA51							

---

5 To determine whether errors associated with the use of the maps and tables are also present in Micro Low Flows.

LID NO	COMMENT	TESTER	DATE

In most instances it should be possible access data using the LID and the route described in test 2b.

UNIT TESTS PHASE 1

Using a route described above.

6 Do we have a complete list of river names? Check with our listings.

TESTER	DATE	COMMENT

7 How much information will the notepad hold/print?

TESTER	DATE	COMMENT

8 How many times can the zoom in facility be used?

TESTER	DATE	COMMENT

9 What happens if a grid reference is entered that is not on a watercourse?

TESTER	DATE	COMMENT

APPENDIX 4

MICRO LOW FLOWS VALIDATION VERSION 1.1

TESTING INSTRUCTIONS FOR SCHEDULED TESTS 1-9

TEST 1

Follow worked example set out in User Guide.

TEST 2a

Choose option shown in parentheses.

```
Menu 1        [ LOW FLOW ANALYSIS ]
Menu 2        [ NEW HYDROMETRIC AREA ]
Menu 3        [ RIVER NAME ]
              [ ---------- ] choose from list
Menu 4        [ CONTINUE ]
Menu 5        [ ANOTHER STRETCH ] define using mouse facility
Menu 7        [ DISPLAY STRETCH VALUES ]
Menu 4        [ PRINT ] enter title - river name and site
Menu 4        [ CONTINUE ]
Menu 5        [ FINISH ]
Menu 8        [ RETURN TO MAIN MENU ]
```

Compare results with those from using the maps and tables.

TEST 2b

```
Menu 1        [ LOW FLOW ANALYSIS ]
Menu 2        [ SAME HYDROMETRIC AREA ]
Menu 3        [ LINE ID ]  taken from printout of test 2a
Menu 4        [ PRINT ] enter title as above
Menu 4        [ CONTINUE ]
Menu 5        [ FINISH ]
Menu 8        [ RETURN TO MAIN MENU ]
```

Compare results.

TEST 2c

```
Menu 1        [ LOW FLOW ANALYSIS ]
Menu 2        [ SAME HYDROMETRIC AREA ]
Menu 3        [ GRID REFERENCE ] taken from printout of test 2a
Menu 4        [ PRINT ] enter title as above
Menu 4        [ CONTINUE ]
Menu 5        [ FINISH ]
Menu 8        [ RETURN TO MAIN MENU ]
```

Compare results.
Complete test sheet (Appendix 3) (signature, date and comment). Comment on a separate sheet if necessary.

TEST 3

```
Menu 1        [ LOW FLOW ANALYSIS ]
Menu 2        [ NEW HYDROMETRIC AREA ]
Menu 3        [ RIVER NAME ] choose [ ------- ] from list
Menu 4        [ CONTINUE ]
Menu 5        [ SAME STRETCH ] or [ ANOTHER STRETCH ]
Menu 7        [ PRINT UPSTREAM ESTIMATES ] enter title
Menu 4        [ CONTINUE ]
Menu 5        [ FINISH ]
Menu 8        [ RETURN TO MAIN MENU ]
```

Compare results with those from maps and tables.
Complete test sheet (Appendix 3) (signature, date and comment). Comment on a separate sheet if necessary.

TEST 4a

```
Menu 1       [ LOW FLOW ANALYSIS ]
Menu 2       [ NEW HYDROMETRIC AREA ]
Menu 3       [ RIVER NAME ] choose [ ------- ] from list
Menu 4       [ CONTINUE ]
Menu 5       [ ANOTHER STRETCH ] define using mouse facility
Menu 7       [ DISPLAY STRETCH VALUES ]
Menu 4       [ NOTEPAD ] enter appropriate comment
Menu 4       [ PRINT ] enter title, river name and site
Menu 4       [ CONTINUE ]
Menu 5       [ FINISH ]
Menu 8       [ RETURN TO MAIN MENU ]
```

Compare results with those from using the maps and tables, check notepad entry.

TEST 4b

```
Repeat as test 4a but enter by Menu 3     [ LINE ID ]
Retrieve notepad entry.                   [ PRINT ]
Check with screen display and printout from test 4a.
```

TEST 4c

Repeat as test 4b but enter by Menu 3 [GRID REFERENCE]

TEST 4d

Repeat tests 4b and 4c but edit the notepad each time and check printout.

Complete test sheet (Appendix 3) (signature, date and comment). Comment on a separate sheet if necessary.

TEST 5

Entry was facilitated using method outlined above.
In most cases enter by Menu 3 [LINE ID]
Check if errors associated with the use of the maps and tables are also present in Micro Low Flows.

TEST 6

Entry was facilitated using method outlined above.
Check list of River Names displayed on the screen with listing from the file for each hydrometric area.

TEST 7

Entry was facilitated using method outlined above.
Enter information to the notepad to determine how much information it will hold, check the printout is the same.

TEST 8

Entry was facilitated using the method outlined above.
Use zoom in facility to check how many times the system will allow you to zoom in.

TEST 9

Entry was facilitated using the method outlined above.
Enter grid references that are not on a watercourse. Record which stretch was selected by Micro Low Flows.

APPENDIX 5

MICRO LOW FLOWS ERROR REPORT - NOTES

1) REF. NO. Each error is numbered consecutively (1,2,3...). Check with both error report files; there is one room 317 and another in room 316.

2) VERSION NO. Each version of the Micro Low Flows software received from IoH should have a unique identification number.

3) PC NO. The number used by IT to identify the PC.

4) IDENTIFIED DURING THE TEST? Some errors may be identified during non-scheduled tests.

5) TEST NO. Scheduled tests are numbered separately, see list.

6) SUMMARY OF PROBLEM Includes; test status at time of error identification; preamble to error, if different to the test schedule and associated error messages.

7) IMPACT ASSESSMENT

A Problem causing an irrecoverable failure. eg. requiring re-booting the system - crashing after producing 6/8 plots.

B Problem prevents work in a particular area eg. inability to use major facility/major facility omitted.

C Problem is impeding but not stopping work in area. eg.precision errors - results not to the required degree of accuracy; throughput errors - the system does not perform to its perceived performance levels.

D Useability problem. eg. minor facility omitted/documentation error/unclear display of results - title line missing from laser prints.

E Suggested menu/access changes to software

F Other

Don't feel obliged to confine your assessment to the categories above.

8) REPORTED TO INSTITUTE OF HYDROLOGY (IOH) Reporting will normally follow the regular Monday briefings and is the responsibility of the project co-ordinator or his nominee. MODE IOH may be phoned immediately following a Category A failure.

9) REPLY Replies from IOH should be acknowledged in this space. If necessary any conversation can be summarised on a separate sheet.

APPENDIX 6
MICRO LOW FLOWS ERROR REPORT

Ref. No.__ Version No._____

PC No._____ Date_____

Identified during test? Yes____ No____

If Yes, Test No._____

Name of tester_____

Summary of problem

Impact Assessment (circle as appropriate)

A B C D E F

Reported to IoH (All A, B & C errors)

Date_____1991 Mode_____ Sign_____

Reply

Date_____1991 Mode_____ Sign_____

Please refer to accompanying notes when completing this form

APPENDIX 7

COMMENT SHEET

(To be filled in following the successful completion of a scheduled test. Please use separate error reporting form for specific errors/problems.)

PC No._____ MICRO LOW FLOWS VERSION No._____ DATE_____

TEST No._____

COMMENT

eg. Test ran smoothly.
Results shown in maps and tables incorrect.
Found the testing instructions difficult to follow.

SIGNATURE_____

APPENDIX 8

MICRO LOW FLOWS ERROR REPORT

NRA

National Rivers Authority
South West Region

Ref. No. 10 Version No. 1.1

PC No. 38m Date 25/4/91

Identified during test? Yes ____ No ✓

If Yes, Test No. Random

Name of tester A.H.

Summary of problem

Q95 given is larger than the Q50.
Ghost given of 75.10 seems very high

Impact Assessment (circle as appropriate)

A B (C) D E F

Reported to IoH (All A, B & C errors)

Date 7/5/91 1991 Mode Mail Sign AH

Reply

Date 5/6/91 1991 Mode Mail Sign RG

Please refer to accompanying notes when completing this form

Manley House
Kestrel Way
Exeter
Devon
EX2 7LQ
Tel: Exeter (0392) 444000
Fax: (0392) 444238

trib Otter

Estimates at	(Easting	3169
	(Northing	1014
	(Line ID (LID)	17751
Catchment area (sq km)		1.25
Average annual rainfall (mm)		1056.
Average potential evaporation (mm)		524.
GHOST		75.100
Average daily flow (cumecs)		.021
Q95 (cumecs)		.016
Q50 (cumecs)		.014

Q95 larger than Q50.

COMMENT SHEET
(To be filled in following the successful completion of a scheduled test. Please use separate error reporting form for specific errors/problems.)

PC No. 381M MICRO LOW FLOWS VERSION No. 1·1 DATE 2/5/91

TEST No. 3.

COMMENT

eg. Test ran smoothly.
Results shown in maps and tables incorrect.
Found the testing instructions difficult to follow.

In several cases Q95 and Q50 were the same or Q95 was higher. This seems to be when there is a high ghost figure and values greater than 0.35 have not been set to 0.35. These results are incorrect in the tables and on Micro Low Flows.

SIGNATURE A.L. Higgins

Ghost value problem

Estimates at	(Easting	3071
	(Northing	827
	(Line ID (LID)	7860
Catchment area (sq km)		.75
Average annual rainfall (mm)		791.
Average potential evaporation (mm)		556.
GHOST		68.963
Average daily flow (cumecs)		.006
Q95 (cumecs)		.004
Q50 (cumecs)		.004

Ghost value problem

Estimates at	(Easting	3091
	(Northing	952
	(Line ID (LID)	8229
Catchment area (sq km)		1.50
Average annual rainfall (mm)		929.
Average potential evaporation (mm)		550.
GHOST		75.833
Average daily flow (cumecs)		.019
Q95 (cumecs)		.014
Q50 (cumecs)		.013

APPENDIX 9

MICRO LOW FLOWS ERROR REPORT

NRA

National Rivers Authority
South West Region

Ref. No. 4 Version No. 1.1

PC No. 381M Date 10/4/91

Identified during test? Yes ✓ No ____

If Yes, Test No. 6

Name of tester A.H.

Summary of problem Hydrometric Area 51
List of river names - number 30 is * Doggsworthy Combe - this is the only one in area that has a * in front of it. The two river names which should come after this are missing.
If you choose * Doggsworthy Combe it returns to Finish on the first page of river names
This one and the two that are missing can be entered by using either the NGR or the LID number
This does not prevent work in this area as can get to information in other ways but it is an error with the systems performance level.

Impact Assessment (circle as appropriate)

A B (C) D E F

Reported to IoH (All A, B & C errors)

Date 25/4/91 1991 Mode Mail Sign A.H.

Reply

Date 5/6/ 1991 Mode Mail Sign R.Grew

Please refer to accompanying notes when completing this form

Manley House
Kestrel Way
Exeter
Devon
EX2 7LQ
Tel: Exeter (0392) 444000
Fax: (0392) 444238

APPENDIX 10.

MICRO LOW FLOWS ERROR REPORT

Ref. No. 14 Version No. 1.1

PC No. 381M Date 6/6/91

Identified during test? Yes ✓ No ____

If Yes, Test No. 3

Name of tester AH

NRA

National Rivers Authority
South West Region

Summary of problem

When the ghost figure is 0.00 Micro Low Flows states n.a for Q95, this is not correct. Q95 should be stated as 0.000 as in the maps and tables.

Impact Assessment (circle as appropriate)

A B (C) D E F

Reported to IoH (All A, B & C errors)

Date 25/4 1991 Mode Mail Sign A.Higgs

Reply

Date 5/6/91 1991 Mode Mail Sign R Grew

Please refer to accompanying notes when completing this form

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Kestrel Way
Exeter
Devon
EX2 7LQ
Tel: Exeter (0392) 444000
Fax: (0392) 444238

area47 example of n.a

Estimates at	(Easting	2475
	(Northing	738
	(Line ID (LID)	10455
Catchment area (sq km)		.75
Average annual rainfall (mm)		1299.
Average potential evaporation (mm)		529.
GHOST		.000
Average daily flow (cumecs)		.018
Q95 (cumecs)		n.a.
Q50 (cumecs)		.008

area48 example of n.a

Estimates at	(Easting	2002
	(Northing	594
	(Line ID (LID)	12748
Catchment area (sq km)		1.50
Average annual rainfall (mm)		1390.
Average potential evaporation (mm)		514.
GHOST		.000
Average daily flow (cumecs)		.042
Q95 (cumecs)		n.a.
Q50 (cumecs)		.017

APPENDIX 11

MICRO LOW FLOWS ERROR REPORT

Ref. No. 12 Version No. 1·1

PC No. 381M Date 31/5/91

Identified during test? Yes ____ No ✓

If Yes, Test No. Random

Name of tester A.H.

NRA

National Rivers Authority
South West Region

Summary of problem

Q50 has been calculated incorrectly both in Micro Low Flows and in the tables.
By using the ghost figures and rainfall data provided the hand calculation of Q50 produces a different result.

Impact Assessment (circle as appropriate)

A B (C) D E F

Reported to IoH (All A, B & C errors)

Date JULY 1991 Mode Report Sign A C Higgins

Reply

Date _____ 1991 Mode _____ Sign _____

Please refer to accompanying notes when completing this form

Manley House
Kestrel Way
Exeter
Devon
EX2 7LQ
Tel: Exeter (0392) 444000
Fax (0392) 444238

TAMAR.

Crowford Br - Q50 calc incorrectly

Estimates at	(Easting	2291
	(Northing	989
	(Line ID (LID)	19892
Catchment area (sq km)		79.00
Average annual rainfall (mm)		1182.
Average potential evaporation (mm)		546.
GHOST		4.499
Average daily flow (cumecs)		1.595
Q95 (cumecs)		.064
Q50 (cumecs)		.851

Gauging station: River Tamar at Crowford Bridge
Description:

Number	47010
Easting	2290
Northing	991
Start year of flow record	1972
End year of flow record	1989
Area (sq. km.)	76.700
Average daily flow (cumecs)	2.509
Q95(1) (cumecs)	
Q50(1) (cumecs)	

Q95(10)propn = 0.0449

Q50(10)propn = 0.55

Q50(1)

$-6.07 + 1.16(0.55 \times 100) - (0.0076 \times 1182) =$

$-6.07 + 63.8 - 8.9832 = 48.7468$

$0.487468 \times 1.595 = 0.778$

Torrington - Q50 calculated incorrectly

Estimates at	(Easting	2488
	(Northing	1187
	(Line ID (LID)	22850
Catchment area (sq km)		665.00
Average annual rainfall (mm)		1214.
Average potential evaporation (mm)		533.
GHOST		8.363
Average daily flow (cumecs)		14.367
Q95 (cumecs)		1.117
Q50 (cumecs)		8.922

Gauging station: River Torridge at Torrington
Description:

Number	50002
Easting	2500
Northing	1185
Start year of flow record	1962
End year of flow record	1989
Area (sq. km.)	663.000
Average daily flow (cumecs)	15.652
Q95(1) (cumecs)	.883
Q50(1) (cumecs)	7.494

Q95 (10) propn = 0.08363
⇒ Q50 (10) propn = 0.60

Q50 (1) percentage =

$-6.07 + 1.16(.60 \times 100) - (0.0076 \times 1214) =$

$-6.07 + 69.6 - 9.2264 = 54.3036$

$0.543036 \times 14.367 =$ 7.80[illegible]

Calculated using the values of SAAR and ADF given above.

Veraby - Q50 calculated incorrectly

Estimates at	{Easting	2775
	{Northing	1267
	{Line ID (LID)	23686
Catchment area (sq km)		54.00
Average annual rainfall (mm)		1340.
Average potential evaporation (mm)		495.
GHOST		8.316
Average daily flow (cumecs)		1.448
Q95 (cumecs)		.112
Q50 (cumecs)		.884

Gauging station: River Yeo at Veraby
Description:

Number	50809
Easting	2774
Northing	1266
Start year of flow record	1968
End year of flow record	1981
Area (sq. km.)	53.700
Average daily flow (cumecs)	1.601
Q95(1) (cumecs)	.115
Q50(1) (cumecs)	.850

Q95 (10) propn = 0.08316
⇒ Q50 (10) propn = 0.60.

Q50(1) percentage:

$-6.07 + 1.16(60) - (0.0076 \times 1340) =$

$-6.07 + 69.6 - 10.184 = 53.346.$

$0.53346 \times 1.448 = 0.772$

APPENDIX 12

NRA

National Rivers Authority
South West Region

MICRO LOW FLOWS ERROR REPORT

Ref. No. 1 Version No. 1.1

PC No. 38IM Date 25/3/91

Identified during test? Yes — No ____

If Yes, Test No. 3 HYA 45

Name of tester RG.

Summary of problem

Test on R. Lim - one of options on river names menu.
- outside SW region. - when data was printed off NGR and Line ID supplied but everything else was missing (n.a
- Repeated test for river within SW. region.

Impact Assessment (circle as appropriate)

A B C (D / E) F

Reported to IoH (All A, B & C errors)

Date 5/3/1991 Mode Mail Sign RG.

Reply

Date 5/4/1991 Mode Mail Sign RG.

Please refer to accompanying notes when completing this form

IoH proposed solution to delete these stretches from network - Agreed 25/4/91.

Manley House
Kestrel Way
Exeter
Devon
EX2 7LQ
Tel: Exeter (0392) 444000
Fax: (0392) 444238

APPENDIX 12.

sting	Northing	Line ID	Area (sq kms)	Mean flow (cumecs)	Q95 (cumecs)	Q50 (cumecs)
3341	922	17317	n.a.	n.a.	n.a.	n.a.
3332	932	17318	n.a.	n.a.	n.a.	n.a.
3333	934	7799	n.a.	n.a.	n.a.	n.a.
3323	933	17319	n.a.	n.a.	n.a.	n.a.
3323	933	8043	n.a.	n.a.	n.a.	n.a.
3338	945	8318	n.a.	n.a.	n.a.	n.a.
3339	942	8321	n.a.	n.a.	n.a.	n.a.
3323	934	17320	n.a.	n.a.	n.a.	n.a.
3324	936	8048	n.a.	n.a.	n.a.	n.a.
3322	932	8046	n.a.	n.a.	n.a.	n.a.
3321	936	17321	n.a.	n.a.	n.a.	n.a.
3316	928	8045	n.a.	n.a.	n.a.	n.a.
3316	930	8047	n.a.	n.a.	n.a.	n.a.
3315	948	17322	n.a.	n.a.	n.a.	n.a.
3314	951	17323	n.a.	n.a.	n.a.	n.a.

APPENDIX 13

MICRO LOW FLOWS ERROR REPORT

Ref. No. 15 Version No. 1·1

PC No. 381M Date 10/4/91

Identified during test? Yes ✓ No ____

If Yes, Test No. 5

Name of tester AH.

National Rivers Authority
South West Region

Summary of problem

Catchment areas calculated incorrectly on Micro Low Flows - also a problem with the maps and tables.

Catchment areas which were inaccurate on the maps and tables (see list attached) were found to be the same on Micro Low Flows.

Impact Assessment (circle as appropriate)

A B C D E F

Reported to IoH (All A, B & C errors)

Date 16/5/91. 1991 Mode Mail Sign A.L Higgins

Reply

Date 5/6/91 1991 Mode Mail Sign A.L Higgins

Please refer to accompanying notes when completing this form

Manley House
Kestrel Way
Exeter
Devon
EX2 7LQ
Tel: Exeter (0392) 444000
Fax: (0392) 444238

			AUTOMATIC ESTIMATION	MANUAL ESTIMATION	CALCULATED AT
45	18357	SS 773 014	3.25	1.74	SS 773 014
45	18153	SY 001 900	11.75	10.07	SY 001 900
45	18165	SY 031 916	2.75	1.65	SY 031 916
45	18216	SX 877 938	0.75	0.40	SX 877 938
45	18215	SX 877 938	0.75	1.59	SX 877 938
46	19109	SX 880 558	5.75	1.85	SX 880 558
46	18796	SX 676 416	4.50	5.73	SX 676 416
46	18808	SX 934 728	4.50	2.40	SX 933 729
46	18822	SX 910 708	5.50	2.74	SX 910 708
46	18993	SX 865 748	15.25	10.65	SX 868 748
47	19658	SX 436 567	13.00	7.50	SX 445 571
47	9738	SX 322 607	<0.25	0.37	SX 322 607
47	10109	SX 458 638	<0.25	1.09	SX 458 638
48	12890	SX 126 523	<0.25	2.76	SX 126 523
48	21457	SW 892 430	7.00	7.58	SW 892 430
48	11601	SW 761 243	<0.25	0.64	SW 761 243
48	21560	SW 755 391	1.50	2.59	SW 755 391
48	21388	SW 909 397	2.00	1.67	SW 909 397
48	11444	SW 620 268	4.25	1.34	SW 620 268
49	14156	SW 917 725	1.75	0.99	SW 917 725
49	14445	SX 202 958	1.50	1.22	SX 202 958
49	14145	SW 861 749	<0.25	1.64	SW 861 749
49	22402	SX 075 812	9.75	7.75	SX 075 812

ALL CATCHMENT AREAS ARE IN KILOMETERS SQUARE
16/5/91
A. HIGGINS

HYDROMETRIC AREA	LID	NGR	AUTOMATIC	MANUAL	CALCULATED AT
50	22624	SS 452 436	5.00	3.41	SS 458 436
50	23258	SS 486 031	1.00	1.67	SS 486 031
50	23785	SS 851 175	0.75	0.37	SS 851 175
50	14832	SX 653 990	2.25	3.71	SX 653 990

APPENDIX 14

MICRO LOW FLOWS ERROR REPORT

NRA

National Rivers Authority
South West Region

Ref. No. 7 Version No. 1.1

PC No. 381m Date 10/4/91

Identified during test? Yes_____ No_____

If Yes, Test No. Radan

Name of tester AH

Summary of problem

River Exe - had selected stretch, then gauge. Took a long time and then said for a long time on screen - MESSAGE - select an option - for much longer than usual. Pressed return & it came up with \ in corner of screen. Typed in microlfs. entered again chose same stretch & was OK, screen shown selected stretch + estuary stretch both highlig[hted]

River Erme - plot - before choice of plotter or laserjet, screen flashed up run time error - too many open files, typed in microlfs, flashed up same as usual then back to \ - typed in microlfs and started again with the same stretch, crashed again after I had chosen laserjet this time - was a blank screen with just - in top left corner, couldn't then type in anything - turned it all off and then on again, then chose the same and it ~~plot~~ printed it off O.K.

Impact Assessment (circle as appropriate)

(A) B C D E F

Reported to IoH (All A, B & C errors)

Date 25/4/91 1991 Mode Mail Sign A L H[illegible]

Reply

Date 5/6/91 1991 Mode Mail Sign R Grew.

Please refer to accompanying notes when completing this form

Manley House
Kestrel Way
Exeter
Devon
EX2 7LQ
Tel. Exeter (0392) 444000
Fax. (0392) 444238

COMMENT SHEET
(To be filled in following the successful completion of a scheduled test.
Please use separate error reporting form for specific errors/problems.)

PC No. 381M MICRO LOW FLOWS VERSION No. 1·1 DATE 11/4/91

TEST No. Random.

COMMENT

eg. Test ran smoothly.
Results shown in maps and tables incorrect.
Found the testing instructions difficult to follow.

R. Erne - plotting on 94-759 - stopped half way through, per raised, screen blank apart from -
- pressed escape, came up with \, typed in Microlfs twice, flashed up first screen of Micro Low Flows then blank again, couldn't type in anything - had to switch off completely. - Tried again - results O.K.
Happened again for R. Garnel and R. Heddon.

Plotting on laserjet - results OK but failed to reappear on screen - displayed : Not ready error reading drive C Abort, Retry, Ignore, Fail. Pressed R and continued O.K.

SIGNATURE A.L Higgins.

APPENDIX 15

MICRO LOW FLOWS ERROR REPORT

NRA

National Rivers Authority
South West Region

Ref. No. 16 Version No. 1.1

PC No. 381m Date 30/4/91

Identified during test? Yes ✓ No ____

If Yes, Test No. 2

Name of tester A Higgins

Summary of problem

When enter NGR previously given by Micro Low Flows the values for a different LID were displayed.

Impact Assessment (circle as appropriate)

A B (C) D E F

Reported to IoH (All A, B & C errors)

Date 12/4/91 1991 Mode Mail Sign A.L. Higgins

Reply

Date 5/6/91 1991 Mode Mail Sign A L Higgins

Please refer to accompanying notes when completing this form

Manley House
Kestrel Way
Exeter
Devon
EX2 7LQ
Tel: Exeter (0392) 444000
Fax: (0392) 444238

COMMENT SHEET
(To be filled in following the successful completion of a scheduled test. Please use separate error reporting form for specific errors/problems.)

PC No. 38IM MICRO LOW FLOWS VERSION No. 1·1 DATE 30/4/91

TEST No. 9

N. G. R. Testing

COMMENT

eg. Test ran smoothly.
Results shown in maps and tables incorrect.
Found the testing instructions difficult to follow.

This was a test I did on the River Sid in hydrometric area 45.
When I put in the NGR given by Micro Low Flows for the required stretch it chose a different stretch with a slightly different NGR. There didn't seem to be any reasoning behind it. This has also happened in other hydrometric areas.

SIGNATURE A. Higgins

Sid - NGR testing 1

Estimates at	(Easting	3140
	(Northing	948
	(Line ID (LID)	17657
Catchment area (sq km)		2.75
Average annual rainfall (mm)		1020.
Average potential evaporation (mm)		544.
GHOST		16.691
Average daily flow (cumecs)		.042
Q95 (cumecs)		.007
Q50 (cumecs)		.028

Sid - NGR testing 2

Estimates at	(Easting	3140
	(Northing	948
	(Line ID (LID)	17657
Catchment area (sq km)		2.75
Average annual rainfall (mm)		1020.
Average potential evaporation (mm)		544.
GHOST		16.691
Average daily flow (cumecs)		.042
Q95 (cumecs)		.007
Q50 (cumecs)		.028

Sid - NGR testing 3

Estimates at	(Easting	3139 ← I entered 3140 948
	(Northing	948 as was given above
	(Line ID (LID)	8236 ← different reach
Catchment area (sq km)		.75
Average annual rainfall (mm)		1006.
Average potential evaporation (mm)		548.
GHOST		31.700
Average daily flow (cumecs)		.011
Q95 (cumecs)		.003
Q50 (cumecs)		.008

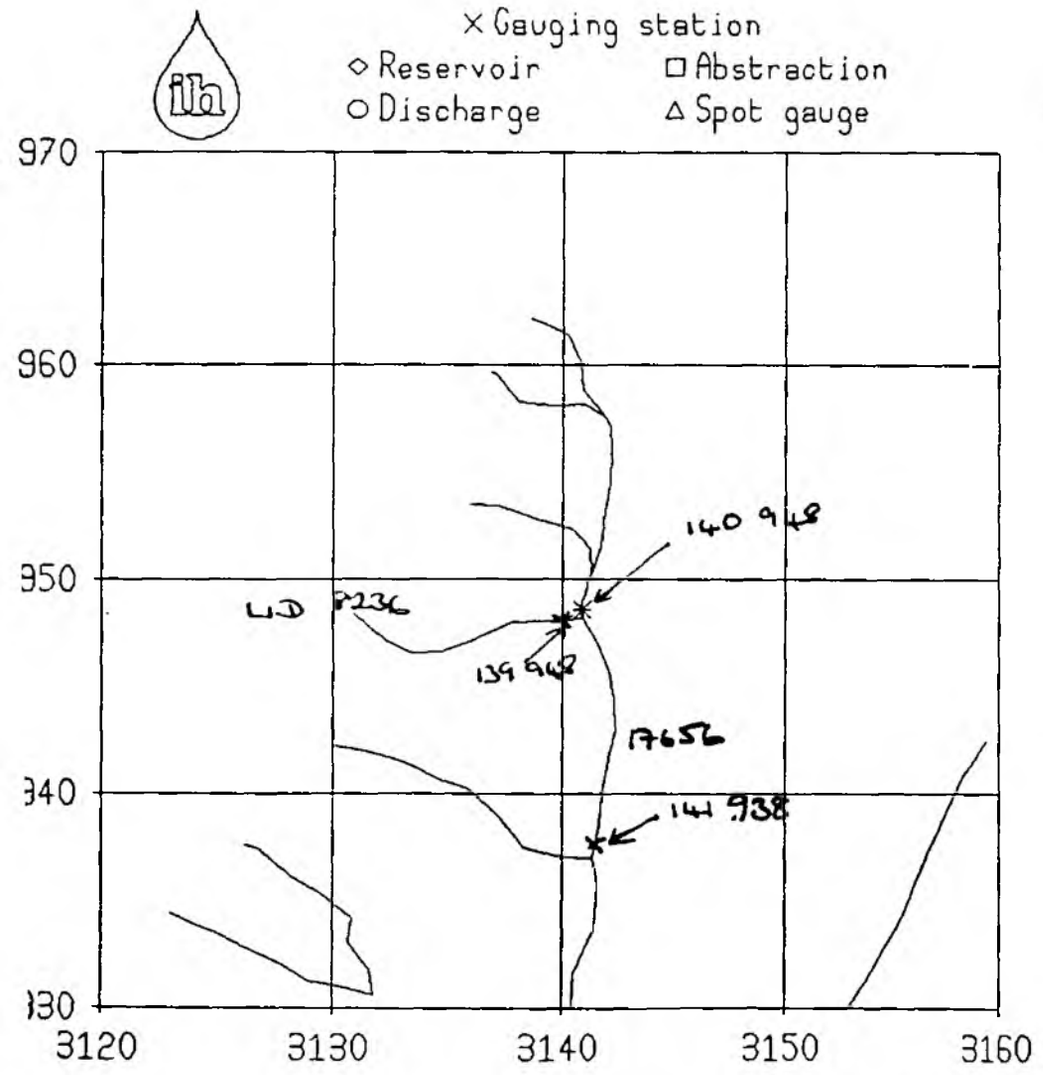
I put in this grid reference

entered 3140 0949

Estimates at	(Easting	3140
	(Northing	948
	(Line ID (LID)	17657
Catchment area (sq km)		2.75
Average annual rainfall (mm)		1020.
Average potential evaporation (mm)		544.
GHOST		16.691
Average daily flow (cumecs)		.042
Q95 (cumecs)		.007
Q50 (cumecs)		.028

entered 3141 0948 — then I entered this it chose a stretch further downstream.

Estimates at	(Easting	3141
	(Northing	938
	(Line ID (LID)	17656
Catchment area (sq km)		5.00
Average annual rainfall (mm)		1014.
Average potential evaporation (mm)		546.
GHOST		15.675
Average daily flow (cumecs)		.076
Q95 (cumecs)		.011
Q50 (cumecs)		.051



Sid - zoom

Estimates at ✳ :

Easting	3140
Northing	948
Line ID (LID)	17657
Area (sq km)	2.75
Annual rainfall(mm)	1020.
Pot. evap. (mm)	544.
GHOST	16.691
MF (cumecs)	.042
Q95 (cumecs)	.007
Q50 (cumecs)	.028

When put in NGR 141 948 – got 141 938

" " " " 140 948 – got 139 948

APPENDIX 16.

MICRO LOW FLOWS ERROR REPORT

NRA

National Rivers Authority
South West Region

Ref. No. 8 Version No. 1·1

PC No. 381M Date 10/4/91

Identified during test? Yes ____ No ✓

If Yes, Test No. Random.

Name of tester AH.

Summary of problem

R. Erme - gauging station shown (see attached plot.) appears to be situated between two river reaches. The information for this gauging station can't be obtained by chosing either of these stretches.

Impact Assessment (circle as appropriate)

A B C D E (F)

Reported to IoH (All A, B & C errors)

Date 25/4/91 1991 Mode Mail Sign [signature]

Reply

Date 5/6/91 1991 Mode Mail Sign R Grew

Please refer to accompanying notes when completing this form

Manley House
Kestrel Way
Exeter
Devon
EX2 7LQ
Tel: Exeter (0392) 444000
Fax: (0392) 444238

COMMENT SHEET
(To be filled in following the successful completion of a scheduled test. Please use separate error reporting form for specific errors/problems.)

PC No. 381M MICRO LOW FLOWS VERSION No. 1·1 DATE 1/

TEST No. Random.

COMMENT

eg. Test ran smoothly.
Results shown in maps and tables incorrect.
Found the testing instructions difficult to follow.

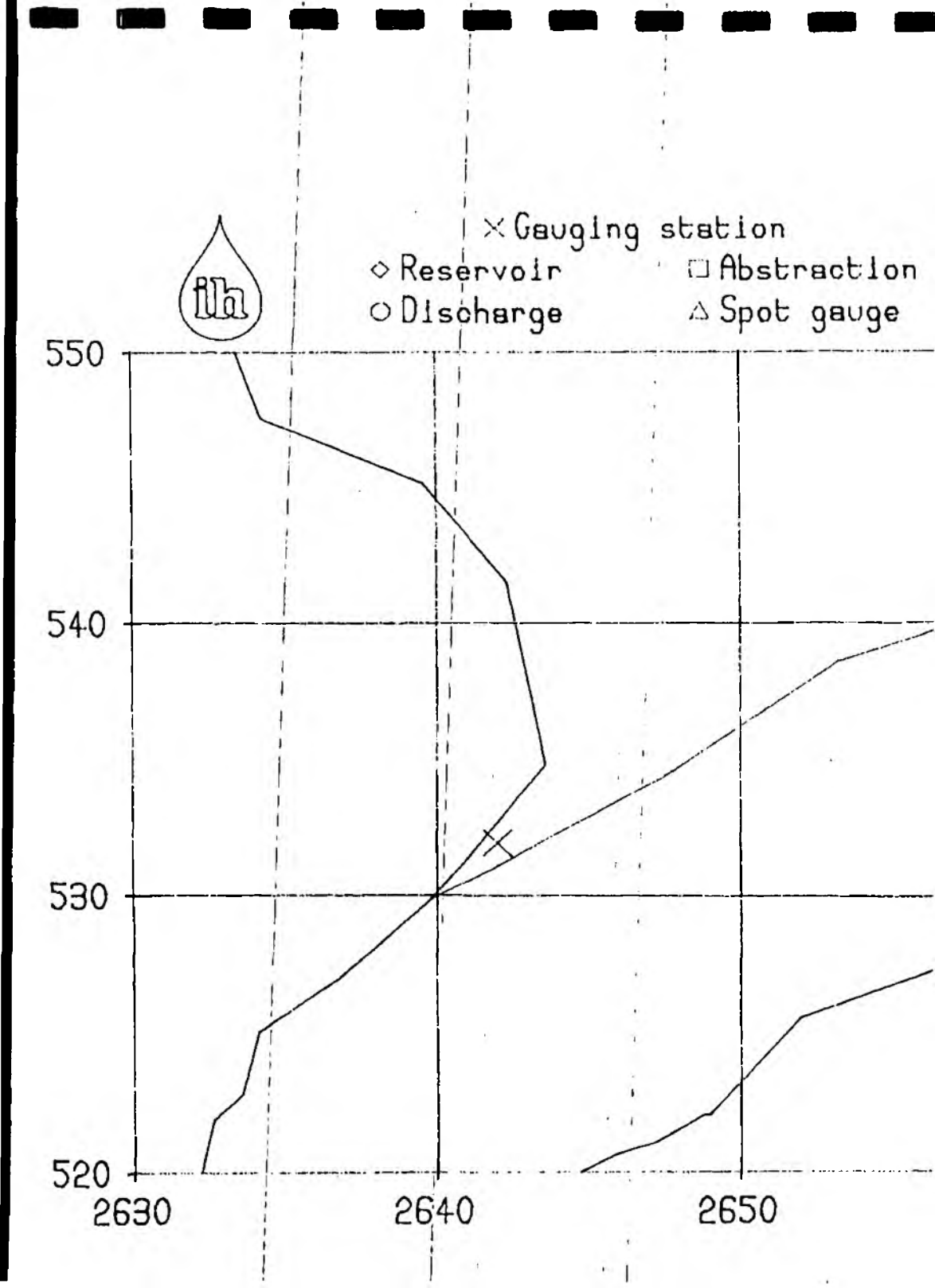
When error 8 000 first reported it seemed that the information relating to Ennington Gauging Station could not be obtained by selecting either of the nearby stretches.

It now seems that the information can be obtained but it depends on where you position the mouse.

If you choose a point at the bottom of the stretch you cannot obtain the information but if you choose a point further upstream you can.

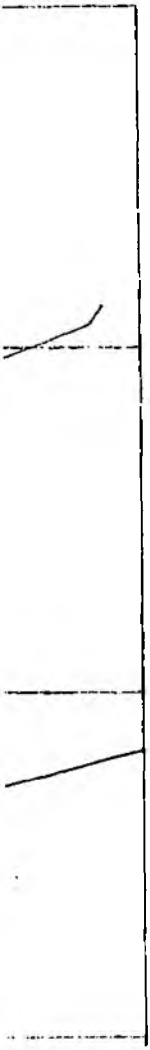
There doesn't seem to be any explanation as to why this is the case.

SIGNATURE A. L. Higgs


× Gauging station
◇ Reservoir
□ Abstraction
○ Discharge
△ Spot gauge
550
540
530
520
2630
2640
2650

Erme - random test

Estimates at :	
Easting	2642
Northing	531
Line ID (LID)	19519
Area (sq km)	16.25
Annual rainfall(mm)	1389.
Pot. evap. (mm)	540.
GHOST	13.041
MF (cumecs)	.438
Q95 (cumecs)	.054
Q50 (cumecs)	.283



2660

APPENDIX 1

APPENDIX 17.

MICRO LOW FLOWS ERROR REPORT

Ref. No. 5 Version No. 1.1

PC No. 381m Date 10/6/91

Identified during test? Yes ✓ No ____

If Yes, Test No. 6

Name of tester A.H.

NRA

National Rivers Authority
South West Region

Summary of problem Hydrometric Area 51

Second page of river names - when try to go back to first page of river names it returns to menu 3 and comes up at bottom of screen with Line ID not found - SERIOUS ERROR

- does not stop work in this area as you can choose river name again to get to the first page.

Impact Assessment (circle as appropriate)

A B (C) D E F

Reported to IoH (All A, B & C errors)

Date 25/4/91 1991 Mode Mail Sign A.L. Hinton

Reply

Date 5/6/91 1991 Mode Mail Sign KGrew

Please refer to accompanying notes when completing this form

Manley House
Kestrel Way
Exeter
Devon
EX2 7LQ
Tel: Exeter (0392) 444000
Fax: (0392) 444238

APPENDIX 18

MICRO LOW FLOWS ERROR REPORT

NRA

National Rivers Authority
South West Region

Ref. No. 2 Version No. 1·1

PC No. 381M Date 8/4/91

Identified during test? Yes ✓ No ____

If Yes, Test No. 4a-d HX45

Name of tester A. HIGGINS.

Summary of problem

Notepad facility : using insert and delete keys.
When inserting spaces or extra information, existing information is deleted.

No wraparound facility. splits words onto separate lines

Impact Assessment (circle as appropriate)

A B (C / D) E F

Reported to IoH (All A, B & C errors)

Date 25/4/91 1991 Mode Mail Sign A.L Higgins

Reply

Date 5/6/91 1991 Mode Mail Sign A. L Higgins

Please refer to accompanying notes when completing this form

Manley House
Kestrel Way
Exeter
Devon
EX2 7LQ
Tel: Exeter (0392) 444000
Fax: (0392) 444238

COMMENT SHEET
(To be filled in following the successful completion of a scheduled test. Please use separate error reporting form for specific errors/problems.)

PC No. 38IM MICRO LOW FLOWS VERSION No. 1.1 DATE 8/4/91

TEST No. 4a - d HYAUS.

COMMENT

eg. Test ran smoothly.
Results shown in maps and tables incorrect.
Found the testing instructions difficult to follow.

Prints easting and northing under notepad heading - although not shown on the screen.

'This stretch has a reservoir' - already entered into the notepad - not in every case - inconsistent.

SIGNATURE A.L Higgins

Exe - test7 notepad

Estimates at	(Easting	3013
	(Northing	793
	(Line ID (LID)	17333
Catchment area (sq km)		1502.25
Average annual rainfall (mm)		1079.
Average potential evaporation (mm)		525.
GHOST		19.733
Average daily flow (cumecs)		26.513
Q95 (cumecs)		5.006
Q50 (cumecs)		17.745

NOTEPAD:

Easting 3013
Northing 793
The Exe drains a catchment of approximately 1195km
The main towns in the Exe catchment are Tiverton,
Exeter, Exmouth and Crediton. The tidal limit of t
he Exe is at St. James weir, Salmonpool on the out
skirts of Exeter. The Exe rises on Exmoor at a poi
nt known as Exe Head near Simonsbath, 4888m above

This is not stored - has been deleted - just for test purposes.

APPENDIX 19.

MICRO LOW FLOWS ERROR REPORT

Ref. No. 3 Version No. 1.1

PC No. 38IM Date 18/3/91

Identified during test? Yes ____ No ✓

If Yes, Test No. Installation

Name of tester RG.

NRA

National Rivers Authority
South West Region

Summary of problem

Entry by NGR.

Screen display: 3 digit Easting
4 digit Northing.

Not a useability problem.

Impact Assessment (circle as appropriate)

A B C D E (F)

Reported to IoH (All A, B & C errors)

Date 18/3/91 1991 Mode Verbal Sign RG.

Reply

Identified during installation.

Date 18/3/1991 Mode Verbal Sign R.G.

Please refer to accompanying notes when completing this form
- would be corrected by V1.2.

Manley House
Kestrel Way
Exeter
Devon
EX2 7LQ
Tel: Exeter (0392) 444000
Fax: (0392) 444238

APPENDIX 20

COMMENT SHEET
(To be filled in following the successful completion of a scheduled test. Please use separate error reporting form for specific errors/problems.)

PC No. 381M MICRO LOW FLOWS VERSION No. 1.1 DATE 10/4/91

TEST No. 7.

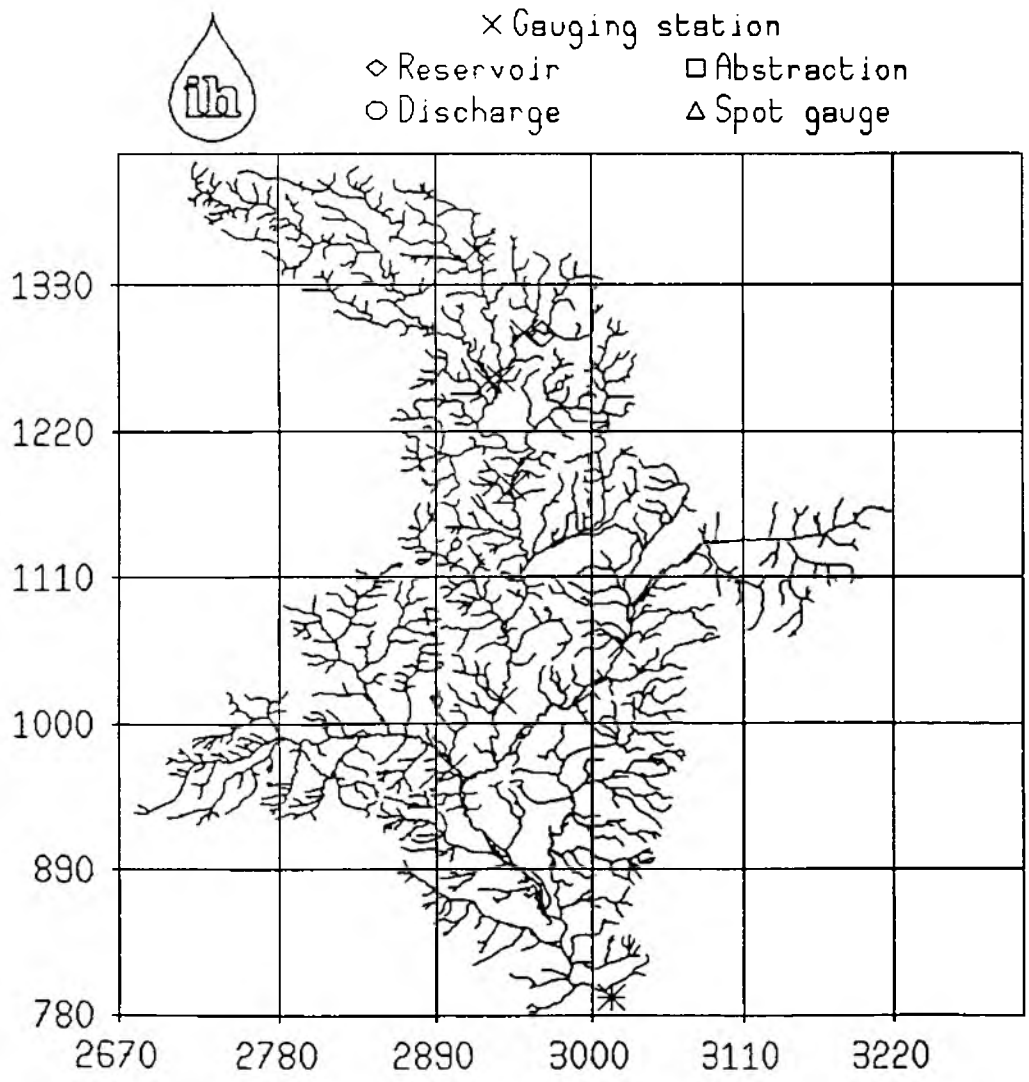
COMMENT

eg. Test ran smoothly.
Results shown in maps and tables incorrect.
Found the testing instructions difficult to follow.

Notepad - approximately 300 spaces in the notepad facility.
No wraparound facility.
Eastings and Northings also printed.

When plotting on laserjet or the plotter, if there is information stored in the notepad for the highlighted obretch this is not printed with the plot, it has to printed out separately.

SIGNATURE A.L. Higgs

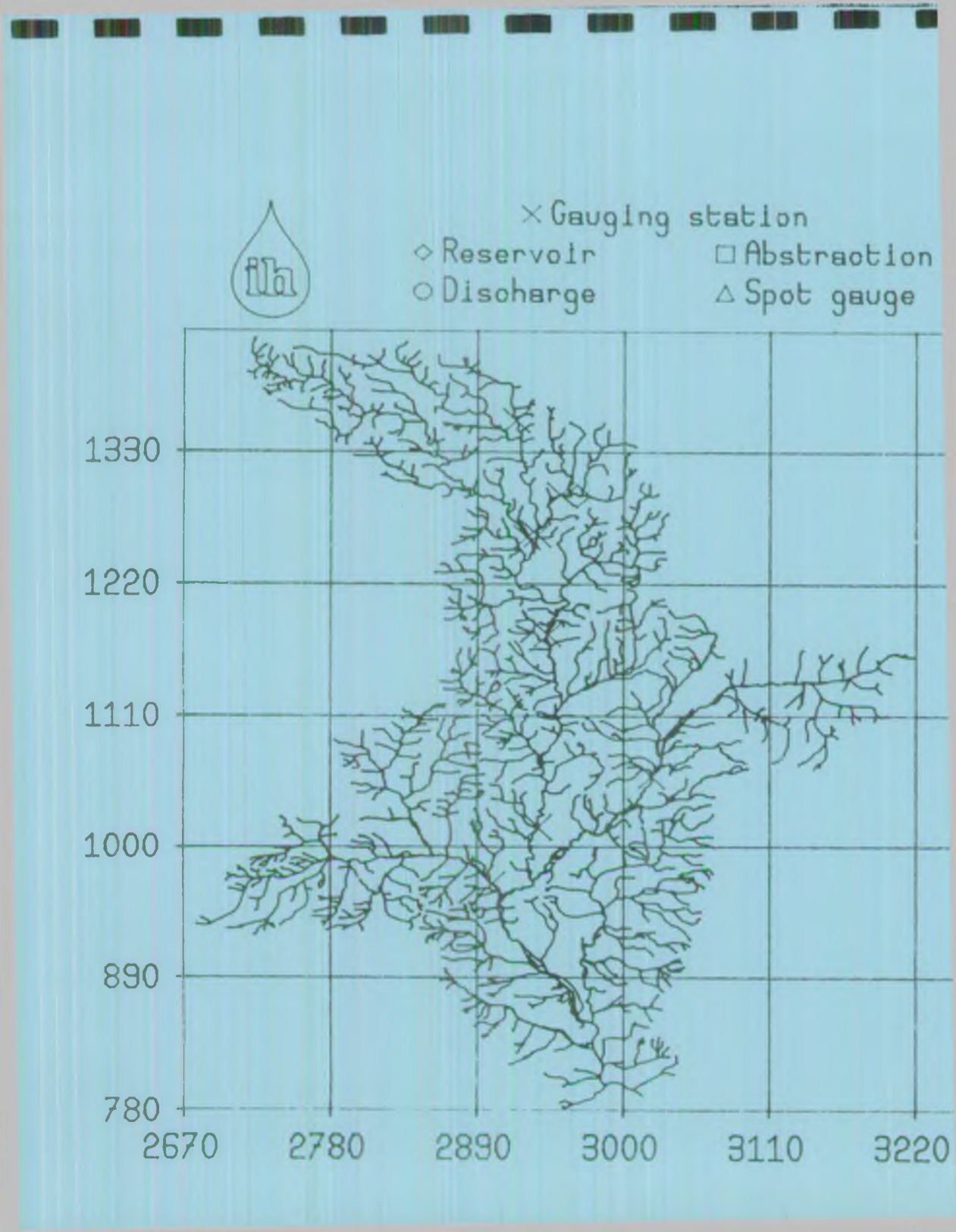


exe- notepad test 7

Estimates at ✳ :

Easting	3013
Northing	793
Line ID (LID)	17333
Area (sq km)	1502.25
Annual rainfall(mm)	1079.
Pot. evap. (mm)	525.
GHOST	19.733
MF (cumecs)	26.513
Q95 (cumecs)	5.006
Q50 (cumecs)	17.745

notepad not printed.


× Gauging station
◇ Reservoir
□ Abstraction
○ Discharge
△ Spot gauge
1330
1220
1110
1000
890
780
2670
2780
2890
3000
3110
3220

exe -test7notepad

Estimates at :	
Easting	3013
Northing	793
Line ID (LID)	17333
Area (sq km)	1502.25
Annual rainfall(mm)	1079.
Pot. evap. (mm)	525.
GHOST	19.733
MF (cumecs)	26.513
Q95 (cumecs)	5.006
Q50 (cumecs)	17.745

Notepad not printed.

APPENDIX 20