



**DEVON AREA  
INTERNAL REPORT**

**INVESTIGATION INTO THE  
FREQUENCY OF STORM  
OVERFLOW OPERATION AT  
BRADWORTHY S.T.W.**

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DEV/WQ/11/96**

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ENVIRONMENT AGENCY

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# INVESTIGATION INTO THE FREQUENCY OF STORM OVERFLOW OPERATION AT BRADWORTHY S.T.W.

## 1. INTRODUCTION

Bradworthy S.T.W. N.G.R. SS 329 135, is a small treatment works with a numeric consent utilising a biological filter system, the final effluent discharges into the River Waldon. However heavy rainfall may cause untreated effluent from the storm settlement tanks to discharge into the river via a screening process.

## 2. TERMS OF REFERENCE

### 2.1 OBJECTIVES

The Devon Area Investigation Team were requested by the Devon Area Water Quality Team to investigate how frequently the storm sewer overflow operated. The data was to be collected and passed on to the Devon Area Water Quality Officer responsible for the Bradworthy catchment.

### 2.2 PROJECT TEAM

T.Cronin ( Project leader )  
M.Humphreys ( Project Manager )  
N.Hicks ( Project Technician & Author )

## 3. METHOD

Bradworthy S.T.W. is a small treatment works utilising a biological filter system. see Appendix III Photograph 1.

To monitor the final effluent and the storm overflow discharges from Bradworthy S.T.W. two Prolec "Water Rat" flow meters were deployed.  
See figure 1 for locations of flow meters.

The first monitor was located where the final effluent pipe discharges into the River Walden at N.G.R. SS 329 133.

The second monitor was located where the storm overflow pipe discharges into a small tributary of the River Waldon at N.G.R. SS 329 135.

The project commenced on 28 March 96. and finished on the 06 August 96.

Rainfall data was obtained from Devon Area Hydrometric department, who monitor daily rainfall from the weather station Bradworthy Jasmine located at "Jasmine cottage" in Bradworthy N.G.R. SS 337 163.

Rainfall data was obtained in an attempt to devise a correlation between the storm sewer overflow operation and rainfall events.



### 3. RESULTS

The monitoring equipment was deployed from the 28/03/96. until 06/08/96. The data was downloaded from the logger and imported into a Lotus 123 format which was saved to floppy disc marked Bradworthy flow.

See Appendix I for flow data from the 28/03/96. until 06/08/96.

No data for the final effluent was available from :-

03.07. on the 03/05/96 until 12.58. on the 09/05/96 due to battery failure,  
23.59. on the 17/05/96 until 13.01. on the 03/06/96 due to equipment flooding.  
See Appendix III Photographs 5 & 6.

No valid data for the storm effluent was available from :-

03.29. on the 03/05/96 until 13.01. on the 03/06/96 due to equipment failure.

See Appendix II For associated rainfall data.

Throughout the investigation, it was essential to frequently clean the probe placed in the final effluent pipe as it was prone to fouling.

### 4. DISCUSSION

From mid April 96 South West Water had contractors at the site installing new storm overflow and final effluent settlement tanks. see Appendix III Photographs 2. & 3.

From site observations on 02/05/96 the contractors started to construct a new inspection chamber for the storm overflow pipe. This work involved both the existing storm overflow pipe and new pipe being housed temporarily in the chamber. see Appendix III Photograph 4.

After discussions with the contractors it was established that all storm overflows had been diverted into the works to discharge via the final effluent pipe. And that this would continue while construction was in progress.

The Water Quality Office was informed of the work being carried out and we were instructed to carry on monitoring both the storm overflow and the final effluent pipes.

The storm overflow was still being diverted when the monitoring equipment was removed from the works on 06/08/96.

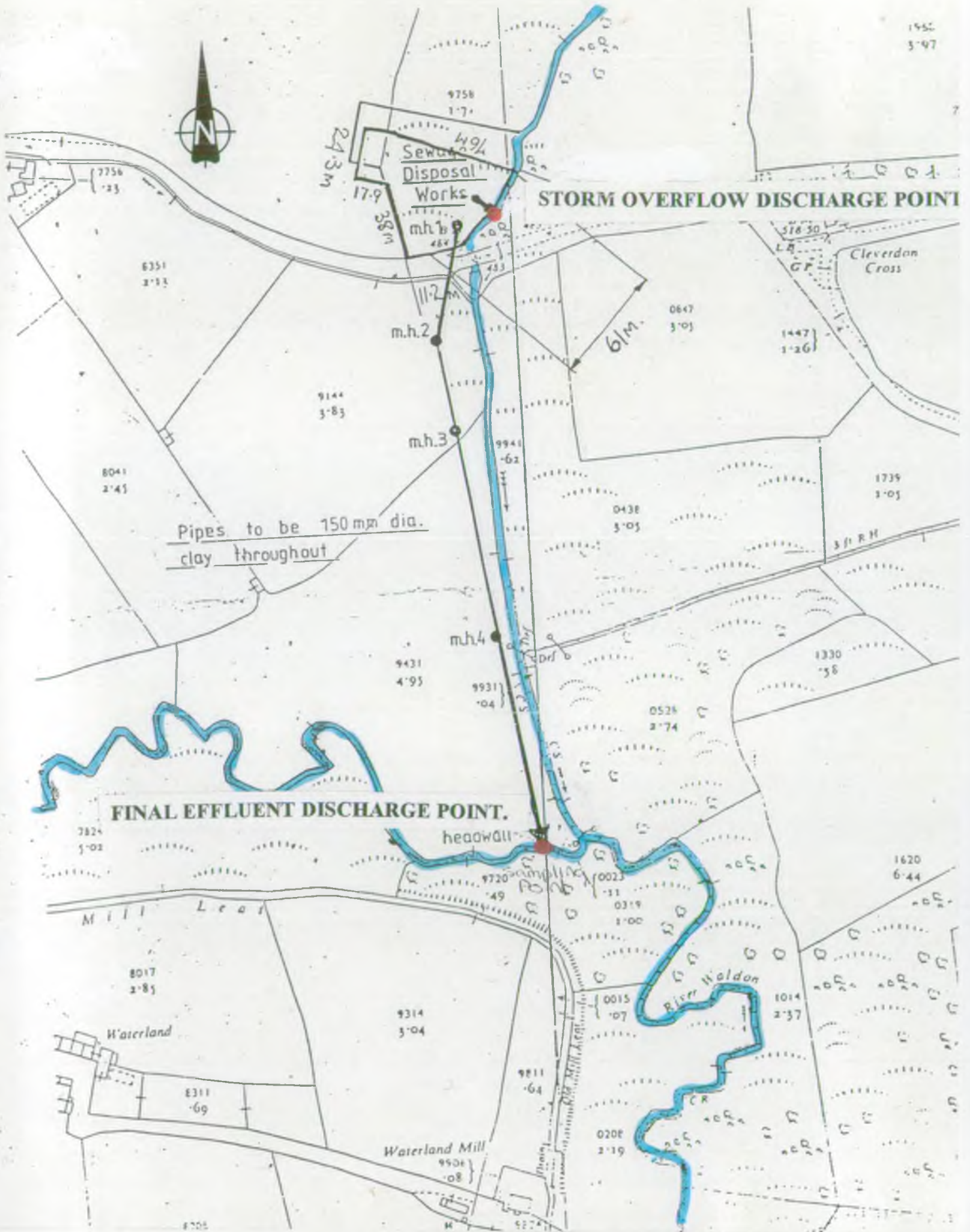
## **5. CONCLUSION**

Due to the comprehensive improvement work being undertaken by South West Water at Bradworthy during the summer, the investigation team were unable to report on the frequency of operation of the storm overflow at the works.

## **6. RECOMMENDATIONS**

The improvement work carried out at Bradworthy S.T.W. during the summer of 1996 impeded the investigation into the frequency of operation of the storm overflow. If information is still required regarding the storm overflow at Bradworthy a further investigation should be carried out when all construction at the works is completed and the new systems have come on line.

**FIGURE 1. Diagram showing location of final effluent discharge point & storm overflow discharge point from Bradworthy S.T.W.**



**APPENDIX I**

## BRADWORTHY FINAL EFFLUENT

DATE	TIME	DAILY FLOW M <sup>3</sup>
28-03-96	15.02 - 23.59	156.84
29-03-96	00.00 - 23.59	387.6
30-03-96	00.00 - 23.59	357.78
31-03-96	00.00 - 23.59	306.48
01-04-96	00.00 - 23.59	276.24
02-04-96	00.00 - 23.59	253.02
03-04-96	00.00 - 23.59	203.28
04-04-96	00.00 - 23.59	347.46
05-04-96	00.00 - 23.59	447.18
06-04-96	00.00 - 23.59	427.38
07-04-96	00.00 - 23.59	451.98
08-04-96	00.00 - 23.59	457.8
09-04-96	00.00 - 23.59	486.12
10-04-96	00.00 - 23.59	559.32
11-04-96	00.00 - 23.59	488.94
12-04-96	00.00 - 23.59	504.12
13-04-93	00.00 - 23.59	640.38
14-04-96	00.00 - 23.59	614.3
15-04-96	00.00 - 12.51	631.56
16-04-96	00.00 - 23.59	527.4
17-04-96	00.00 - 23.59	573.9
18-04-96	00.00 - 23.59	554.52
19-04-96	00.00 - 23.59	515.16
20-04-96	00.00 - 23.59	517.68
21-04-96	00.00 - 23.59	496.5
22-04-96	00.00 - 23.59	533.04
23-04-96	00.00 - 23.59	585.3
24-04-96	00.00 - 23.59	633.06
25-04-96	00.00 - 23.59	527.82
26-04-96	00.00 - 23.59	589.56
27-04-96	00.00 - 23.59	583.2
28-04-96	00.00 - 23.59	566.4
29-04-96	00.00 - 23.59	537.54
30-04-96	00.00 - 23.59	553.38
01-05-96	00.00 - 23.59	486.12
02-05-96	00.00 - 23.59	453.66
03-05-96	00.00 - 03.07	36.12
09-05-96	12.58 - 23.59	227.82
10-05-96	00.00 - 23.59	450.78
11-05-96	00.00 - 23.59	480.9



12-05-96	00.00 - 23.59	455.46
13-05-96	00.00 - 23.59	495.84
14-05-96	00.00 - 23.59	457.98
15-05-96	00.00 - 23.59	419.88
16-05-96	00.00 - 23.59	441.36
17-05-96	00.00 - 23.59	491.04
03-06-96	13.01 - 23.59	469.98
04-06-96	00.00 - 23.59	722.16
05-06-96	00.00 - 23.59	693.36
06-06-96	00.00 - 23.59	654.84
07-06-96	00.00 - 23.59	704.04
08-06-96	00.00 - 23.59	619.02
09-06-96	00.00 - 23.59	580.92
10-06-96	00.00 - 23.59	630.78
11-06-96	00.00 - 23.59	838.92
12-06-96	00.00 - 23.59	581.7
13-06-96	00.00 - 23.59	543.42
14-06-96	00.00 - 23.59	508.68
15-06-96	00.00 - 23.59	487.5
16-06-96	00.00 - 23.59	468.3
17-06-96	00.00 - 23.59	417.12
18-06-96	00.00 - 23.59	325.98
19-06-96	00.00 - 23.59	319.92
20-06-96	00.00 - 23.59	760.86
21-06-96	00.00 - 23.59	349.68
22-06-96	00.00 - 23.59	336.48
23-06-96	00.00 - 23.59	342.06
24-06-96	00.00 - 23.59	460.8
25-06-96	00.00 - 23.59	526.56
26-06-96	00.00 - 23.59	592.38
27-06-96	00.00 - 23.59	499.38
28-06-96	00.00 - 23.59	710.22
29-06-96	00.00 - 23.59	577.56
30-06-96	00.00 - 23.59	676.2
01-07-96	00.00 - 23.59	659.46
02-07-96	00.00 - 23.59	566.58
03-07-96	00.00 - 23.59	804.6
04-07-96	00.00 - 23.59	792.3
05-07-96	00.00 - 23.59	807.24
06-07-96	00.00 - 23.59	786.42
07-07-96	00.00 - 23.59	769.02
08-07-96	00.00 - 23.59	445.26
09-07-96	00.00 - 23.59	610.2
10-07-96	00.00 - 23.59	848.22

11-07-96	00.00 - 23.59	744.24
12-07-96	00.00 - 23.59	1040.22
13-07-96	00.00 - 23.59	1099.08
14-07-96	00.00 - 23.59	1179.84
15-07-96	00.00 - 23.59	488.52
16-07-96	00.00 - 23.59	521.46
17-07-96	00.00 - 23.59	160.74
18-07-96	00.00 - 23.59	272.04
19-07-96	00.00 - 23.59	310.14
20-07-96	00.00 - 23.59	356.4
21-07-96	00.00 - 23.59	298.74
22-07-96	00.00 - 23.59	319.32
23-07-96	00.00 - 23.59	201.42
24-07-96	00.00 - 23.59	199.26
25-07-96	00.00 - 23.59	194.52
26-07-96	00.00 - 23.59	308.28
27-07-96	00.00 - 23.59	255
28-07-96	00.00 - 23.59	321.9
29-07-96	00.00 - 23.59	528.84
30-07-96	00.00 - 23.59	434.22
31-07-96	00.00 - 23.59	268.02
01-08-96	00.00 - 23.59	451.38
02-08-96	00.00 - 23.59	351.72
03-08-96	00.00 - 23.59	329.34
04-08-96	00.00 - 23.59	248.22
05-08-96	00.00 - 23.59	281.76
06-08-96	00.00 - 07.00	4.02

## BRADWORTHY STORM EFFLUENT

DATE	TIME	DAILY FLOW m <sup>3</sup>
28-03-96	15.01 - 23.59	9.66
29-03-96	00.00 - 23.59	0
30-03-96	00.00 - 23.59	0.06
31-03-96	00.00 - 23.59	0
01-04-96	00.00 - 23.59	0
02-04-96	00.00 - 23.59	0
03-04-96	00.00 - 23.59	0
04-04-96	00.00 - 23.59	1.2
05-04-96	00.00 - 23.59	0
06-04-96	00.00 - 23.59	0
07-04-96	00.00 - 23.59	0
08-04-96	00.00 - 23.59	0
09-04-96	00.00 - 23.59	0
10-04-96	00.00 - 23.59	0.12
11-04-96	00.00 - 23.59	0
12-04-96	00.00 - 23.59	313.86
13-04-96	00.00 - 23.59	0
14-04-96	00.00 - 23.59	0
15-04-96	00.00 - 23.59	0.18
16-04-96	00.00 - 23.59	183.9
17-04-96	00.00 - 23.59	0
18-04-96	00.00 - 23.59	4.02
19-04-96	00.00 - 23.59	11.34
20-04-96	00.00 - 23.59	0
21-04-96	00.00 - 23.59	13.2
22-04-96	00.00 - 23.59	18.48
23-04-96	00.00 - 23.59	14.1
24-04-96	00.00 - 23.59	26.04
25-04-96	00.00 - 23.59	49.5
26-04-96	00.00 - 23.59	0
27-04-96	00.00 - 23.59	12.72
28-04-96	00.00 - 23.59	36.36
29-04-96	00.00 - 23.59	57.3
30-04-96	00.00 - 23.59	77.04
01-05-96	00.00 - 23.59	42.36
02-05-96	00.00 - 23.59	0
03-05-96	00.00 - 03.29	0
		<i>Bmsdies</i>
05-05-96	21.30 - 23.59	698.46
06-05-96	00.00 - 23.59	10616.46
07-06-96	00.00 - 23.59	3525

08-05-96	00.00 - 23.59	0
09-05-96	00.00 - 23.59	129
10-05-96	00.00 - 23.59	0
11-05-96	00.00 - 23.59	0
12-05-96	00.00 - 23.59	0
13-05-96	00.00 - 23.59	138.06
14-05-96	00.00 - 23.59	144041.58
15-05-96	00.00 - 23.59	715562.16
16-05-96	00.00 - 23.59	0
17-05-96	00.00 - 23.59	10.02
18-05-96	00.00 - 23.59	0
19-05-96	00.00 - 23.59	80.7
20-05-96	00.00 - 23.59	3.72
21-05-96	00.00 - 23.59	0
22-05-96	00.00 - 23.59	28.74
23-05-96	00.00 - 23.59	0
24-05-96	00.00 - 23.59	0
25-05-96	00.00 - 23.59	0
03-06-96	13.01 - 23.59	0
04-06-96	00.00 - 23.59	0
05-06-96	00.00 - 23.59	0
06-06-96	00.00 - 23.59	0
07-06-96	00.00 - 23.59	0
08-06-96	00.00 - 23.59	0
09-06-96	00.00 - 23.59	0
10-06-96	00.00 - 23.59	0
11-06-96	00.00 - 23.59	0
12-06-96	00.00 - 23.59	0
13-06-96	00.00 - 23.59	0
14-06-96	00.00 - 23.59	0
15-06-96	00.00 - 23.59	0
16-06-96	00.00 - 23.59	0
17-06-96	00.00 - 23.59	0
18-06-96	00.00 - 23.59	0
19-06-96	00.00 - 23.59	0
20-06-96	00.00 - 23.59	0
21-06-96	00.00 - 23.59	0
22-06-96	00.00 - 23.59	0
23-06-96	00.00 - 23.59	0
24-06-96	00.00 - 23.59	0
25-06-96	00.00 - 23.59	0
26-06-96	00.00 - 23.59	0
27-06-96	00.00 - 23.59	0
28-06-96	00.00 - 23.59	0

29-06-96	00.00 - 23.59	0
02-07-96	16.06 - 23.59	0.12
03-07-96	00.00 - 23.59	0
04-07-96	00.00 - 23.59	0
05-07-96	00.00 - 23.59	0
06-07-96	00.00 - 23.59	0
07-07-96	00.00 - 23.59	0
08-07-96	00.00 - 23.59	0
09-07-96	00.00 - 23.59	0
09-07-96	00.00 - 23.59	0
10-07-96	00.00 - 23.59	0
11-07-96	00.00 - 23.59	0
12-07-96	00.00 - 23.59	0
13-07-96	00.00 - 23.59	0
14-07-96	00.00 - 20.35	0
17-07-96	15.08 - 23.59	19.86
18-07-96	00.00 - 23.59	12.6
19-07-96	00.00 - 23.59	12.54
20-07-96	00.00 - 23.59	13.26
21-07-96	00.00 - 23.59	12.66
22-07-96	00.00 - 23.59	12.66
23-07-96	00.00 - 23.59	0.66
24-07-96	00.00 - 23.59	0
25-07-96	00.00 - 23.59	7.38
26-07-96	00.00 - 23.59	2.88
27-07-96	00.00 - 23.59	0
28-07-96	00.00 - 23.59	0
29-07-96	00.00 - 23.59	0.12
30-07-96	00.00 - 23.59	0
31-07-96	00.00 - 23.59	0
01-08-96	00.00 - 23.59	0
02-08-96	00.00 - 23.59	0
03-08-96	00.00 - 23.59	0
04-08-96	00.00 - 23.59	0
05-08-96	00.00 - 23.59	0
06-08-96	00.00 - 23.59	0

Photograph 1. Bradworthy S.T.W. showing screening tank and biological filter bed.



Photograph 2. New final settlement & storm overflow tanks installed in 1996.



Photograph 3. Storm overflow tank installed 1996.



Photograph 4. Storm overflow inspection chamber. containing two pipes while under construction



Photograph 5. Flooded field containing final effluent pipe and Water Rat logger box on 24/05.96.



Photograph 6. final effluent sampling point and floating Water rat logger box on 24/05/96.

