



**ENVIRONMENT PROTECTION DEPARTMENT
CORNWALL AREA**

**Par EC Bathing Beach
Investigation – 2000
FINAL DRAFT REPORT**

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ENVIRONMENT AGENCY

Information Services Unit

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Due Date

Par EC Bathing Beach Investigation

1. INTRODUCTION

1.1 Background

The EC Designated Bathing Water at Par (81614842) on the south coast of Cornwall is sampled in accordance with the requirements of the EC Bathing Waters Directive (EC/76/100).

Data gathered during the 1998 Bathing Water season (beginning of May to the end of September) demonstrated the bathing water to be at significant risk of exceeding the imperative standards for faecal and total coliforms (2,000 and 10,000/100ml respectively). On 08/07/98 the routine sample contained 2166/100ml of faecal coliforms and on 21/08/98 a sample contained faecal and total coliform concentrations of 1,980/100ml 14,800/100ml respectively. Should the faecal coliform concentrations in this sample have been 21/100ml greater the bathing beach would have failed the Directive in 1998.

Similar results were found in 1999 with 10,100/100ml of total coliforms on 16/07/99 and 9,300/100ml on 16/09/99. This sample also contained 2,300/100ml of faecal coliforms. Again the Bathing Water narrowly passed the imperative standard for the year. Salinity data from the samples mentioned above and for many samples taken from the beach show that the sampling point is influenced by freshwater, by up to 50%.

No samples collected in the 2000 bathing season exceeded the imperative standards but, as with nine out of the ten previous bathing seasons, the beach did fail to meet the stricter guideline standards (faecal coliforms 100 / 100ml, total coliforms 500 / 100ml & faecal streps 100 / 100ml).

1.2 Objectives

To identify the sources of bacterial contamination to the Par Beach Bathing Water which prevent the Beach from meeting the EC Bathing Water Guideline Standards.

2. METHODS

- 2.1 Review the archived monitoring data.
- 2.2 Conduct a series of site visits to identify the freshwater inputs and the potential sources of bacterial contamination.
- 2.3 Deploy two sub-daily logging raingauges in the Par River catchment, one in Roche at the top of the catchment and the other at St Austell North (Luxulyan) Sewage Treatment Works (STW).
- 2.4 Install a 'Stormlog' Event logger on the Storm Overflow at Luxulyan STW to gain information on spill frequency.
- 2.5 Request that South West Water (SWW) install flow logging equipment at the inlet to Luxulyan STW and at the flow to treatment.



- 2.6 Compile a program of additional monitoring of the freshwater inputs coinciding with the routine statutory bathing water sampling (usually weekly).
- 2.7 Conduct a time of travel study for the Par River from Molinnis near Bugle to the A3082 Bridge, at the tidal limit.
- 2.8 Conduct a survey to assess the impact of Luxulyan STW on the Par Beach Bathing Water using *Bacillus globigii* tracing spores.
- 2.9 Liaise closely with EPr Central Team and share findings.

3.0 RESULTS

The following table lists the location of the data collected and figures showing the catchment and sample sites.

Data	Location
Par River and Treffry Canal Data	Tables 1 – 4
Par River Tributaries	Table 5
Tywardreath, Treemill and Par Sands Streams	Table 6
Survey Plan (03/08/00)	Table 7
Survey Results (03/08/00)	Tables 8 – 14
Par Beach Investigation Freshwater Sites	Figure 1
Survey Sites (03/08/00)	Figure 2
Luxulyan STW Final Effluent and Storm Tank Consents	Appendices 1 & 2

4.0 DISCUSSION

4.1

There are six freshwater inputs which flow onto Par Beach, the Par Sands Stream which flows onto the eastern side and the Par River / *Treffry Canal, St Blazey, Treemill and Tywardreath Streams, all of which meet at the tidal limit and enter at the west side of the beach (See figures 1 & 2). Samples collected from all sources during this investigation have contained high coliform concentrations, especially after or during rainfall events. However, due to the comparative flow and the poorer general quality, the Par River and Treffry Canal deliver the highest coliform loading to the Par Beach area. A sample collected from the Par River approximately 1km upstream of the beach at the A3082 bridge (Site 13) on 16/09/99 contained total coliform concentrations >999,999/100ml. These concentrations were found upstream as far as the Luxulyan STW (approx. 7km from Par Beach). Total and faecal coliform concentrations upstream of the STW were 69,000 and 65,000/100ml respectively. A sub-daily logging rain gauge, which had been installed a few days earlier at the Luxulyan STW, recorded 28.4mm of rain in a 19-hour period up to 09:00 on 16/09/99.

* The Treffry Canal is part of a flood alleviation scheme which takes excess flow from the Par River at Pons Mill (approx 4 km upstream of the Bathing Beach). The Canal then runs parallel with the Par River until the tidal limit where they meet.

The additional monitoring program which coincided with the statutory bathing samples confirmed that the Luxulyan STW contributed a significant coliform loading to the Par River

/ Treffry Canal which then impacts on the Par Beach Bathing Water. It was therefore deemed necessary to design a survey that would quantify the impact using *B.globigii* spores released into the final effluent of the STW.

More detailed catchment work including the cataloguing of farm inputs and wet weather survey work to identify sources of bacterial contamination to the St Blazey, Treemill, Tywardreath and Par Sands Streams is planned for Spring 2001 prior to the bathing season. Tributaries to the Par River will also be included in this work.

4.2 Quantitative Survey – 03/08/00

Method

4.2.1 STW Dosing

The dosing of the Luxulyan STW Final Effluent (FE) began at 01:00 to allow for the six hours time of travel to the A3082 Bridge in Par, just above the tidal limit. A survey had been conducted previously to establish the travel time from the upper catchment to the beach by releasing a small quantity of rhodamine dye into the river and tracking its progress with the use of a fluorometer.

The tracing survey was conducted on a spring tide in order for the Luxulyan STW peak morning flows to have maximum impact on the beach around the low water time (approx 15:15 BST). *B.globigii* titrations and flow measurements were recorded along with STW flow and hourly (FE) sampling and river sampling up and downstream of the STW (see tables 8 & 9). In the absence of adequate flow recording data from the STW a simple 'V' notch was made and two readings were taken from one of the two final effluent tanks, the flow reading was then doubled. Given the crude nature of this flow measuring it must be stressed that the flow measurements used for the calculations in this survey are not accurate but do give a reasonable indication of flows & dilutions.

The influent flow logging equipment, which the Agency requested SWW to install at the STW, was apparently unreliable due to the deployment location so these data were not released by SWW.

On the day of the survey one of the three aerators in the activated sludge ditch at Luxulyan STW was not operating. Information gathered from the SWW operative on site suggests that one aerator automatically shuts down when there are sufficient dissolved oxygen concentrations in the ditch. Previous samples taken from the works when only two aerators were operating show that indicator organism concentrations elevate by up to one order of magnitude.

4.2.2 Freshwater Inputs

To limit the number of samples taken the four stream inputs were sampled every two hours. The Par River and Treffry Canal were sampled hourly. All samples were analysed for total and faecal coliforms and faecal streps. Samples were taken from 07:00 to 19:30 (see tables 12 & 13). The results show that the St Blazey and Tywardreath Streams did contain elevated coliform concentrations that were likely to be caused by the overnight rain experienced before the survey. Although these inputs will contribute to the Bathing Water contamination, the loadings are small in comparison to the Par River and Treffry Canal. These data will however be used to prioritise the wet weather work in Spring 2001.

4.2.3 Beach Sampling

Due to the close proximity to Par Beach samples were taken from the Polkerris Beach Statutory monitoring point at hourly intervals and analysed for total and faecal coliforms, faecal streps, *B.globigii* and salinity (see table 11).

As well as the statutory Bathing Water transect at Par Beach which runs from the east of Par Beach to the east of Killyvarder Rock, samples were taken from a second transect at the western side of the beach which ran to the western side of Killyvarder Rock, closer to the Par River and Treffry Canal inputs (see Figure 2).

In addition to the samples taken from the two transects at guideline depth (1m depth of water, 30 cm below the surface) a second set of samples were taken from approximately knee depth from both transects. The four points were sampled half hourly, all were analysed for *B.globigii* and salinity. Samples collected every hour were also analysed for total and faecal coliforms and faecal streps.

B.globigii spores were found in both transects on the beach at approximately 08:00 but in low concentrations. Higher concentrations were not found until approximately HW+ 2 hours as the tide ebbed. Peaks in spore concentrations were found at both transects at approximately LW± 2. Spore concentrations at the statutory Bathing Water transect at LW dipped due to the main flow of the Par River passing to the south of Killyvarder rock, this was also apparent in the salinity data. From the twelve samples which were collected from the statutory Monitoring Point at Par Beach on 3/8/00, three samples exceeded the Imperative Standard for faecal coliforms and one sampled failed the Imperative Standard for total coliforms. It must be noted though that contamination from the other freshwater inputs will have contributed to the coliform loading on the beach on that day. Higher coliform concentrations and lower *B.globigii* dilutions were found at the western transect sites due to their closer proximity to the Par River and Treffry Canal (see tables 9 & 10).

The survey demonstrated that the final effluent from the Luxulyan STW contained sufficient loadings of total and faecal coliforms to cause Guideline non-compliance at the Par Beach Bathing Water (500 & 100 / 100ml respectively). The addition of Ultra Violet disinfection at the final effluent point of the STW would help secure future compliance at Par Beach.

It appears that it is too late to have the required work that would be needed at Luxulyan STW included in the Asset Management Program 3 (AMP3). The additional treatment is recommended for inclusion in AMP4.

4.3 Luxulyan STW

Frequent visits have been made to the Luxulyan STW since September 1999. A 'Stormlog' event logger installed at the effluent point of the storm tank within the sewage works in 1999 showed that the storm tank discharges for weeks at a time in periods of wet weather. It was therefore deemed wise to re-install the logger before the 2000-bathing season to monitor the spill frequency.

Whilst visiting the STW for sampling purposes it became apparent that sewage would frequently flow into the storm tank in periods of dry weather. These flows to the storm tank occurred at peak flow periods, usually in the morning and would not fill the tank to the point

of discharge. This does however indicate that the STW is hydraulically overloaded, even in dry weather. Information informally gained from SWW staff suggests that increasing the flow to full treatment causes the humus blanket to be lifted in the two secondary treatment tanks therefore risking a breach of consent at the final effluent point (Consent details are shown in appendix 1).

Examination of the consent for the storm tank (appendix 2) suggests that insufficient volumes of sewage are being fully treated before discharges from the storm tank. The data from the 'Stormlog' event logger shows that in times of prolonged wet weather the storm tank discharges continuously, for weeks at a time. The table below summarises the data from the event logger.

Month	Total Duration of Spill(s) (hh:mm)	Total Duration of Spill(s) (days)	No. of spills	Rainfall at Luxulyan (mm)
May 2000	6:30	0.3	2	84.2
June 2000	0:00	0.0	0	35.0
July 2000	5:09	0.2	2	98.2
August 2000	5:34	0.2	1	103.4
September 2000	114:41	4.8	5	169.2
October 2000	603:00	25.1	1	274.2
November 2000	712:10	29.7	1	258.8

A further request has been made to SWW to install accurate flow logging equipment at two points in the inlet works at Luxulyan STW.

5. CONCLUSIONS

- 5.1 Bathing Water quality at Par Beach is affected at times of wet weather by the freshwater inputs to the beach. Data from survey work conducted during this investigation will be used to prioritise the fieldwork for spring 2001. **(Delayed due to the foot and mouth outbreak).**
- 5.2 The South West Water Sewage Treatment Works at Luxulyan discharges sufficient loadings of faecal and total coliforms to cause Bathing Water Guideline failures at Par Beach.
- 5.3 The Luxulyan STW appears to be hydraulically overloaded resulting in a decrease of storm sewage attenuation. A significant discharge from the storm tank at Luxulyan STW could contain sufficient bacterial loadings as to cause Bathing Water Imperative Standard failures at Par Beach.
- 5.4 The storm tank at Luxulyan STW is thought to be discharging storm sewage before sufficient volumes of sewage are being fully treated by the STW. This conclusion was drawn using a crude flow recording method and may be disproved if SWW provide accurate inlet flow data.
- 5.5 The screening plant at the inlet to Luxulyan STW appears to block frequently which consequently floods the inlet works and allows sewage debris into the system. Some of this debris can be found in the outlet of the stormtank.

6. RECOMMENDATIONS

- 6.1** Further investigate the freshwater inputs to the Par Beach, prioritising the work using previous data and adopting the Cornwall Area farm inputs cataloguing method which has recently been proven to be of significant value.

Action: EPr Investigations Team Leader

- 6.2** Continue to request accurate inlet flow data for the Luxulyan STW to ensure storm tank consent compliance.

Action: EPr Central Team Leader

- 6.3** Include the need for disinfection of the final effluent at Luxulyan STW in the AMP4 list, which runs from 2006 – 2010. Request that the timetable for improvement be brought forward into AMP3.

Action: Cornwall Area Environment Planning

Table 1

Site 1 - Par River at Lavrenn Bridge - 81610210 (SX 0320 5916)

Date	Time	Total Coliforms (No./100ml)	Faecal Coliforms (No./100ml)	Faecal Streps (No./100ml)	Rainfall (Past 24hrs) (mm)
22/06/00	09:20	10.0	0.0	0.0	2.0
28/06/00	09:25	127.0	36.0	55.0	0.0
04/07/00	12:40	63000.0	60000.0	14450.0	27.5
17/07/00	11:33	4400.0	2200.0	91.0	0.0
	Mean	16884.3	20745.3	4865.3	

Site 2 - Par River U/s of St Austell North (Luxulyan) STW FE - 81610190 (SX 0440 5800)

Date	Time	Total Coliforms (No./100ml)	Faecal Coliforms (No./100ml)	Faecal Streps (No./100ml)	Rainfall (Past 24hrs) (mm)
16/09/99	10:45	69000.0	65000.0	17500.0	26.5
11/10/99	15:23	4800.0	2300.0	140.0	1.5
10/12/99	13:45	827.0	650.0	64.0	0.0
03/05/00	10:42	550.0	520.0	18.0	0.0
09/05/00	10:25	2400.0	2100.0	109.0	0.0
21/05/00	10:02	1654.0	1209.0	136.0	5.6
27/05/00	9:45	20000.0	16000.0	700.0	13.0
08/06/00	10:50	6200.0	3000.0	210.0	0.0
14/06/00	9:50	3200.0	3000.0	55.0	2.3
22/06/00	9:35	5000.0	5200.0	45.0	2.0
28/06/00	10:11	873.0	680.0	73.0	0.0
04/07/00	12:13	87000.0	74000.0	42000.0	27.5
17/07/00	11:55	10720.0	6800.0	220.0	0.0
	Mean	16324.9	13804.5	4713.1	

Site 3 - St Austell North (Luxulyan) STW FE - 81610188 (SX 0450 5760)

Date	Time	Total Coliforms (No./100ml)	Faecal Coliforms (No./100ml)	Faecal Streps (No./100ml)	Rainfall (Past 24hrs) (mm)
16/09/99	10:35		>1000000.0	900000.0	26.5
11/10/99	15:30	96000.0	4900.0	23000.0	1.5
10/12/99	13:40	118000.0	67000.0	9000.0	0.0
03/05/00	10:35	192000.0	153000.0	22000.0	0.0
09/05/00	10:16	780000.0	440000.0	146000.0	0.0
21/05/00	9:55	>200000.0	96000.0	23000.0	5.6
27/05/00	9:40	>200000.0	20000.0	4200.0	13.0
02/06/00	9:40	>200000.0	32000.0	4200.0	0.5
08/06/00	10:55	18400000.0	4400000.0	1527000.0	0.0
14/06/00	10:00	>200000.0	80000.0	80000.0	2.3
22/06/00	9:42	740000.0	580000.0	57000.0	2.0
28/06/00	10:08	600000.0	230000.0	44000.0	0.0
04/07/00	12:20	>1000000.0	>1000000.0	42000.0	27.5
17/07/00	11:45	480000.0	12000.0	2500.0	0.0
	Mean	1785076.9	579635.7	205992.9	

Rainfall (Today's)

(mm)

0.6
0.0
3.2
0.0

Rainfall (Today's)

(mm)

2.0
0.0
0.0
0.0
4.4
0.4
16.5
6.5
1.5
0.6
0.0
3.2
0.0

**Gauge
Board**

0.4
0.3
0.3
0.3

0.3
0.3
0.6
0.3

Rainfall (Today's)

(mm)

2.0
0.0
0.0
0.0
4.4
0.4
16.5
1.6
6.5
1.5
0.6
0.0
3.2
0.0

Table 2

Site 5 - Par River D/s of St Austell North (Luxulyan) STW - 81610186 (SX 0460 5800)

Date	Time	Total Coliforms (No./100ml)	Faecal Coliforms (No./100ml)	Faecal Streps (No./100ml)	Rainfall (Past 24hrs) (mm)	Rainfall (Today's) (mm)
16/10/99	9:55	>999999.0	220000.0	25000.0	26.5	2.0
11/10/99	15:15	58000.0	7500.0	980.0	1.5	0.0
10/12/99	13:55	9100.0	4500.0	<1000.0	0.0	0.0
15/12/99	11:00	122000.0	34000.0	2300.0	2.0	1.1
03/05/00	10:53	146000.0	10550.0	909.0	0.0	0.0
09/05/00	10:38	154000.0	88000.0	3800.0	0.0	4.4
21/05/00	10:15	120000.0	6400.0	430.0	5.6	0.4
27/05/00	10:03	42000.0	4500.0	5400.0	13.0	16.5
08/06/00	11:12	35000.0	5400.0	650.0	0.0	6.5
14/06/00	10:12	49000.0	11270.0	3000.0	2.3	1.5
22/06/00	10:00	64000.0	58000.0	2000.0	2.0	0.6
28/06/00	10:22	98000.0	10090.0	1009.0	0.0	0.0
04/07/00	12:04	>200000.0	84000.0	63000.0	27.5	3.2
17/07/00	12:05	64000.0	28000.0	460.0	0.0	0.0
	Mean	154364.3	40872.1	7817.0		

Site 7 - Par River at Treffry Bridge - 81610172 (SX 5688 1072)

Date	Time	Total Coliforms (No./100ml)	Faecal Coliforms (No./100ml)	Faecal Streps (No./100ml)	Rainfall (Past 24hrs) (mm)	Rainfall (Today's) (mm)
16/09/99	10:10	>999999.0	520000.0	35000.0	26.5	2.0
11/10/99	15:00	30000.0	5400.0	490.0	1.5	0.0
10/12/99	14:10	9450.0	3800.0	640.0	0.0	0.0
03/05/00	11:10	88000.0	7500.0	670.0	0.0	0.0
09/05/00	10:55	132000.0	37000.0	991.0	0.0	4.4
21/05/00	10:30	40000.0	4000.0	410.0	5.6	0.4
27/05/00	10:12	28000.0	4800.0	540.0	13.0	16.5
08/06/00	11:40	11910.0	1673.0	290.0	0.0	6.5
14/06/00	10:28	25000.0	2600.0	2100.0	2.3	1.5
22/06/00	10:15	67000.0	43000.0	230.0	2.0	0.6
28/06/00	10:33	34000.0	2400.0	510.0	0.0	0.0
17/07/00	12:20	24000.0	1100.0	280.0	0.0	0.0
	Mean	124113.3	52772.8	3512.6		

Site 9 - Treffry Canal at Pons Mill (SX 0735 5612)

Date	Time	Total Coliforms (No./100ml)	Faecal Coliforms (No./100ml)	Faecal Streps (No./100ml)	Rainfall (Past 24hrs) (mm)	Rainfall (Today's) (mm)
03/05/00	11:25	12000.0	3300.0	330.0	0.0	0.0
09/05/00	11:20	98000.0	28000.0	390.0	0.0	4.4
21/05/00	10:50	48000.0	2900.0	360.0	5.6	0.4
27/05/00	10:32	26000.0	2700.0	720.0	13.0	16.5
08/06/00	12:30	945.0	290.0	64.0	0.0	6.5
14/06/00	10:50	3400.0	680.0	127.0	2.3	1.5
22/06/00	10:40	640.0	740.0	109.0	2.0	0.6
28/06/00	10:46	34000.0	1191.0	600.0	0.0	0.0
04/07/00	11:45	180000.0	97000.0	115000.0	27.5	3.2
17/07/00	12:40	11450.0	927.0	220.0	0.0	0.0
	Mean	41443.5	13772.8	11792.0		

Table 3

Site 8 - Par River D/s of Potts Mill - 81610156 (SX 0732 5605)

Date	Time	Total Coliforms (No./100ml)	Faecal Coliforms (No./100ml)	Faecal Streps (No./100ml)	Rainfall (Past 24hrs) (mm)	Rainfall (Today) (mm)
16/09/99	9:55	>1000000.0	880000.0	9700.0	26.5	2.0
11/10/99	14:50	41000.0	4600.0	460.0	1.5	0.0
10/12/99	14:20	15400.0	7500.0	670.0	0.0	0.0
09/05/00	11:15	116000.0	35000.0	540.0	0.0	4.4
21/05/00	10:45	78000.0	3400.0	440.0	5.6	0.4
27/05/00	10:27	18640.0	2700.0	620.0	13.0	16.5
08/06/00	12:15	6200.0	1245.0	109.0	0.0	6.5
14/06/00	10:45	21000.0	3900.0	750.0	2.3	1.5
22/06/00	10:32	58000.0	24000.0	300.0	2.0	0.6
28/06/00	10:42	24000.0	2100.0	390.0	0.0	0.0
04/07/00	10:55	>20000.0	82000.0	190000.0	27.5	3.2
17/07/00	12:35	12090.0	1181.0	200.0	0.0	0.0
	Mean	117527.5	87302.2	17014.9		

Site 10 - Par River at St Blazey Bridge - 81610134 (SX 0705 5518)

Date	Time	Total Coliforms (No./100ml)	Faecal Coliforms (No./100ml)	Faecal Streps (No./100ml)	Rainfall (Past 24hrs) (mm)	Rainfall (Today) (mm)
03/08/99	10:50		16000.0	240.0	0.9	0.2
13/08/99	11:15		2400.0	440.0	0.0	2.9
20/08/99	11:30		1350.0	260.0	0.3	0.0
10/09/99	12:10	>20000.0	3600.0		0.0	0.0
16/09/99	9:45	>1000000.0	85000.0	8600.0	26.5	2.0
16/09/99	10:40	>20000.0	>20000.0			
19/09/99	10:27	>20000.0	6500.0		10.6	0.0
11/10/99	14:35	9400.0	4700.0	380.0	1.5	0.0
10/12/99	14:28	11200.0	7300.0	973.0	10.8	26.8
03/05/00	11:05	>20000.0	5400.0	350.0	0.0	0.0
09/05/00	18:25	>20000.0	>20000.0	1045.0	0.0	4.4
21/05/00	10:45	37000.0	3400.0	480.0	5.6	0.4
27/05/00	11:55	28000.0	2600.0	390.0	13.0	16.5
08/06/00	14:20	13360.0	891.0	200.0	0.0	6.5
14/06/00	10:15	39000.0	3200.0	660.0	2.3	1.5
22/06/00	10:50	31000.0	3000.0	380.0	2.0	0.6
28/06/00	11:55	32000.0	3000.0	300.0	0.0	0.0
03/07/00	11:35	108000.0	15640.0	900.0	6.2	27.5
04/07/00	11:05	80000.0	74000.0	182000.0	27.5	3.2
11/07/00	10:55		780.0	155.0	0.5	0.7
17/07/00	12:55	10630.0	1009.0	154.0	0.0	0.0
30/07/00	10:20	26000.0	1281.0	270.0	0.0	0.0
04/08/00	10:50	38000.0	3300.0	700.0	1.0	0.0
11/08/00	10:25	136000.0	4800.0	155.0	0.0	0.0
17/08/00	11:45	36000.0	1800.0	182.0	0.9	9.8
23/08/00	11:05	5800.0	780.0	173.0	0.0	0.4
04/09/00	11:30	<10.0	27.0	<10.0	0.0	1.4
11/09/00	12:15	6700.0	460.0	91.0	0.0	0.0
	Mean	72837.5	10436.4	7979.5		

Table 4

Site 13 - Par River at A3082 Bridge 816100138 (SX 0747 5352)

Date	Time	Total Coliforms (No./100ml)	Faecal Coliforms (No./100ml)	Faecal Streps (No./100ml)	Rainfall (Past 24hrs) (mm)	Rainfall (Today's) (mm)
03/08/99	10:40		18000.0		0.9	0.2
13/08/99	11:05		2500.0		0.0	2.9
20/08/99	11:25		2600.0		0.3	0.0
10/09/99	12:20	12800.0	3300.0		0.0	0.0
16/09/99	9:35	>1000000.0	230000.0	730000.0	26.5	2.0
16/09/99	10:50	>20000.0	>20000.0			
19/09/99	10:20	>20000.0	12900.0		10.6	0.0
11/10/99	14:20	5200.0	1320.0	340.0	1.5	0.0
10/12/99	14:35	22000.0	8910.0	882.0	10.8	26.8
03/05/00	11:20	>20000.0	3400.0	340.0	0.0	0.0
09/05/00	16:25	>20000.0	17400.0	480.0	0.0	4.4
21/05/00	10:55	44000.0	2500.0	72.0	5.6	0.4
27/05/00	12:10	19000.0			13.0	16.5
14/06/00	10:00	37000.0	5300.0	680.0	2.3	1.5
22/06/00	10:35	58000.0	3200.0	310.0	2.0	0.6
28/06/00	12:05	32000.0	12450.0	260.0	0.0	0.0
03/07/00	11:20	114000.0	22000.0	780.0	6.2	27.5
04/07/00	11:27	>200000.0	140000.0	185000.0	27.5	3.2
11/07/00	11:00	6500.0	872.0	173.0	0.5	0.7
17/07/00	12:45	6400.0	1063.0	190.0	0.0	0.0
30/07/00	10:10	15270.0	1181.0	340.0	0.0	0.0
04/08/00	10:45	72000.0	2500.0	350.0	1.0	0.0
11/08/00	10:15	120000.0	2300.0	210.0	0.0	0.0
17/08/00	11:30	31000.0	2200.0	210.0	0.9	9.8
23/08/00	11:20	4800.0	2000.0	200.0	0.0	0.4
04/09/00	11:55	845.0	270.0	470.0	0.0	1.4
11/09/00	12:05	7400.0	2000.0	118.0	0.0	0.0
	Mean	78675.6	20006.4	46070.3		

Site 14 - Treffry Canal at A3082 Bridge - 81610205 (SX 0752 5353)

Date	Time	Total Coliforms (No./100ml)	Faecal Coliforms (No./100ml)	Faecal Streps (No./100ml)	Rainfall (Past 24hrs) (mm)	Rainfall (Today's) (mm)
03/05/00	11:25		<10.0	<10.0	0.0	0.0
09/05/00	16:20	630.0	580.0	280.0	0.0	4.4
21/05/00	11:00	4400.0	480.0	260.0	5.6	0.4
27/05/00	12:15	13550.0			13.0	16.5
08/06/00	13:20	91.0			0.0	6.5
14/06/00	10:05	340.0	136.0	73.0	2.3	1.5
22/06/00	10:30	540.0	250.0	260.0	2.0	0.6
28/06/00	12:10	24000.0	20000.0	240.0	0.0	0.0
03/07/00	11:15	178000.0	7500.0	600.0	6.2	27.5
04/07/00	11:26	180000.0	105000.0	175000.0	27.5	3.2
11/07/00	11:10	3500.0	2000.0	182.0	0.5	0.7
17/07/00	12:40	12450.0	936.0	45.0	0.0	0.0
30/07/00	10:15	10000.0	1200.0	290.0	0.0	0.0
04/08/00	10:40	42000.0	2700.0	500.0	1.0	0.0
11/08/00	10:10	110000.0	4800.0	182.0	0.0	0.0
17/08/00	11:20	35000.0	1291.0	290.0	0.9	9.8
23/08/00	11:25	5800.0	1064.0	220.0	0.0	0.4
04/09/00	12:00	4300.0	680.0	10.0	0.0	1.4
11/09/00	12:00	3600.0	780.0	136.0	0.0	0.0
	Mean	34900.1	8788.4	10504.3		

Table 5

Site 4 - Treskilling Stream prior to Par River (SX 0452 5803)

Date	Time	Total Coliforms (No./100ml)	Faecal Coliforms (No./100ml)	Faecal Streps (No./100ml)	Rainfall (Past 24hrs) (mm)	Rainfall (Today's) (mm)
10/12/99	13:47	<10000.0	<10000.0	<10000.0	10.8	26.8
03/05/00	10:48	440.0	260.0	<10.0	0.0	0.0
09/05/00	10:33	280.0	230.0	27.0	0.0	4.4
21/05/00	10:10	560.0	330.0	90.0	5.6	0.4
27/05/00	09:55	680.0	430.0	340.0	13.0	16.5
02/06/00	09:50	No data	No data	No data	0.5	1.6
08/06/00	11:05	127.0	155.0	10.0	0.0	8.5
14/06/00	10:09	9820.0	1118.0	82.0	2.3	1.5
22/06/00	09:55	44000.0	2900.0	918.0	0.0	0.6
28/06/00	10:17	855.0	945.0	300.0	0.0	0.0
04/07/00	12:07	18120.0	7500.0	6200.0	27.5	3.2
17/07/00	12:02	2800.0	3200.0	210.0	0.0	0.0
	Mean	7768.2	1706.8	818.2		

Site 6 - Tredinnick Trib at Gattys Bridge (SX 0552 5797)

Date	Time	Total Coliforms (No./100ml)	Faecal Coliforms (No./100ml)	Faecal Streps (No./100ml)	Rainfall (Past 24hrs) (mm)	Rainfall (Today's) (mm)
16/09/99	10:15	67000.0	65000.0	9500.0	26.5	2.0
11/10/99	15:00	2100.0	310.0	50.0	1.5	0.0
10/12/99	14:05	780.0	630.0	570.0	10.8	26.8
03/05/00	11:00	350.0	340.0	10.0	0.0	0.0
09/05/00	10:47	780.0	720.0	91.0	0.0	4.4
21/05/00	10:22	1081.0	1009.0	350.0	5.6	0.4
27/05/00	10:06	3200.0	4100.0	520.0	13.0	16.5
02/06/00	10:05	127.0	145.0	55.0	0.5	1.6
08/06/00	11:25	1361.0	780.0	45.0	0.0	8.5
14/06/00	10:20	4800.0	780.0	173.0	2.3	1.5
22/06/00	10:07	1182.0	1172.0	270.0	0.0	0.6
28/06/00	10:27	1073.0	720.0	260.0	0.0	0.0
04/07/00	11:56	60000.0	47000.0	17550.0	27.5	3.2
17/07/00	12:15	945.0	760.0	136.0	0.0	0.0
	Mean	10341.4	8819.0	2112.9		

Site 11 - Bodelva Stream at Sylvanmill (St Blazey) (SX 0688 5520)

Date	Time	Total Coliforms (No./100ml)	Faecal Coliforms (No./100ml)	Faecal Streps (No./100ml)	Rainfall (Past 24hrs) (mm)	Rainfall (Today's) (mm)
10/12/99	14:15	3600.0	836.0	109.0	10.8	26.8
03/05/00	11:15	1255.0	680.0	36.0	0.0	0.0
09/05/00	11:03	1063.0	620.0	10.0	0.0	4.4
21/05/00	10:35	12000.0	230.0	54.0	5.6	0.4
27/05/00	10:20	2200.0	620.0	118.0	13.0	16.5
08/06/00	12:00	1563.0	320.0	45.0	0.0	8.5
14/06/00	10:36	1291.0	909.0	36.0	2.3	1.5
22/06/00	10:25	16000.0	10730.0	55.0	0.0	0.6
28/06/00	10:52	11090.0	8000.0	2000.0	0.0	0.0
04/07/00	11:40	3900.0	2200.0	1664.0	27.5	3.2
17/07/00	12:30	1263.0	36.0	81.0	0.0	0.0
	Mean	5020.5	2289.2	382.5		

Site 12 - St Blazey Stream at A3082 Bridge (SX 0746 5351)

Date	Time	Total Coliforms (No./100ml)	Faecal Coliforms (No./100ml)	Faecal Streps (No./100ml)	Rainfall (Past 24hrs) (mm)	Rainfall (Today's) (mm)
21/05/00	11:07	5600.0	600.0	600.0	5.6	0.4
27/05/00	10:55	5000.0	1800.0	870.0	13.0	16.5
02/06/00	11:00		936.0		0.5	1.6
08/06/00	13:15	2500.0	1427.0	240.0	0.0	8.5
14/06/00	11:10	2400.0	800.0	460.0	2.3	1.5
22/06/00	11:00	3000.0	2800.0	540.0	0.0	0.6
28/06/00	11:12	8000.0	3400.0	700.0	0.0	0.0
04/07/00	11:28	76000.0	62000.0	35000.0	27.5	3.2
03/08/00	7:14	23000.0	8550.0	8180.0	15.5	0.0
	Mean	15687.5	9145.9	5823.8		

Table 6

Site 15 - Treemill Stream at A3082 Bridge (SX 0752 5352)

Date	Time	Total Coliforms (No./100ml)	Faecal Coliforms (No./100ml)	Faecal Streps (No./100ml)	Rainfall (Past 24hrs) (mm)	Rainfall (Today's) (mm)
04/07/00	11:22	17000.0	8820.0	2100.0	27.5	3.2
17/07/00	12:55	640.0	220.0	45.0	0.0	0.0
	Mean	8820.0	4520.0	1072.5		

Site 16 - Tywardreath Stream at Tidal Limit (SX 0783 5355)

Date	Time	Total Coliforms (No./100ml)	Faecal Coliforms (No./100ml)	Faecal Streps (No./100ml)	Rainfall (Past 24hrs) (mm)	Rainfall (Today's) (mm)
21/05/00	11:03	3300.0	2600.0	981.0	5.6	0.4
27/05/00	10:50	1700.0	2400.0	640.0	13.0	16.5
08/06/00	12:50	2700.0	1827.0	320.0	0.0	8.5
14/06/00	11:05	2900.0	580.0	400.0	2.3	1.5
22/06/00	10:55	31000.0	4600.0	173.0	0.0	0.6
28/06/00	11:02	2200.0	740.0	590.0	0.0	0.0
04/07/00	11:20	116000.0	98000.0	82000.0	27.5	3.2
17/07/00	12:50	6000.0	845.0	191.0	0.0	0.0
	Mean	20725.0	13949.0	10661.9		

Site 17 - Par Sands - Stream A - 81610603 (SX 0870 5320)

Date	Time	Total Coliforms (No./100ml)	Faecal Coliforms (No./100ml)	Faecal Streps (No./100ml)	Salinity (g/kg)	Rainfall (Past 24hrs) (mm)	Rainfall (Today's) (mm)
03/08/99	11:10		2300.0	1150.0	<1.0	0.9	0.2
13/08/99	11:30		960.0	760.0	2.9	0.0	2.9
20/08/99	11:15		540.0	280.0	<1.0	0.3	0.0
10/09/99	12:00	580.0	640.0	210.0	2.2	0.0	0.0
16/09/99	11:15	>20000.0	>20000.0	>20000.0	<1.0	26.5	2.0
19/09/99	10:48	100.0	990.0	350.0	<1.0	0.0	0.4
10/12/99	15:03	9500.0	8730.0	680.0		10.8	26.8
03/05/00	10:55	200.0	182.0	<10.0	<1.0	0.0	0.0
09/05/00	16:40	580.0	520.0	18.0	<1.0	0.0	4.4
21/05/00	10:30	640.0	330.0	100.0	<1.0	5.6	0.4
27/05/00	11:35	3600.0	2300.0	420.0	<1.0	13.0	16.5
08/06/00	12:20	240.0	270.0	270.0	<1.0	0.0	6.5
14/06/00	9:40	380.0	340.0	100.0	<1.0	2.3	1.5
22/06/00	11:00	280.0	290.0	240.0	<1.0	2.0	0.6
28/06/00	11:35	260.0	164.0	23.0		0.0	0.0
03/07/00	11:45	6200.0	3400.0	270.0		6.2	27.5
11/07/00	10:30	5700.0	4800.0	430.0		0.5	0.7
17/07/00	13:40	4000.0	2700.0	2400.0		0.0	0.0
30/07/00	9:45	1572.0	836.0	610.0		0.0	0.0
04/08/00	11:05	580.0	480.0	310.0		1.0	0.0
11/08/00	9:40	780.0	310.0	73.0		0.0	0.0
17/08/00	12:40		864.0	360.0		0.9	9.8
04/09/00	11:05	936.0	280.0	460.0		0.0	1.4
11/09/00	12:40	740.0	380.0	220.0		0.0	0.0
	Mean	2843.4	2191.9	1292.8			

Table 8

Par River Upstream of Luxulyan STW (81610190)

Time (BST)	Total Coliform (No. / 100 ml)	aecal Coliform (No. / 100 ml)	Faecal Streps (No. / 100 ml)	<i>B.globigii</i> (No. / 100 ml)
0:50	260.0	91.0	<10.0	36.0
2:10	200.0	164.0	27.0	
2:56	227.0	136.0	45.0	
3:56	2900.0	1436.0	164.0	
4:56	2600.0	1550.0	82.0	
6:54	600.0	280.0	55.0	
7:51	2100.0	1100.0	91.0	
8:51	350.0	200.0	290.0	
9:52	2100.0	410.0	200.0	
10:44	4600.0	3300.0	1327.0	
11:48	350.0	200.0	360.0	
12:48	560.0	270.0	300.0	

Luxulyan STW FE (81610188)

Time (BST)	Total Coliform (No./100ml)	aecal Coliform (No./100ml)	Faecal Streps (No./100ml)	<i>B.globigii</i> (No./100ml)
0:55	>999999.0	>999999.0	28000.0	< 10.0
2:13	>999999.0	>999999.0	24000.0	
3:00	2000000.0	2000000.0	44000.0	
4:00	>999999.0	1760000.0	25000.0	
4:56	>999999.0	>999999.0	24000.0	
5:57	2000000.0	2000000.0	32000.0	
7:00	>999999.0	160000.0	26000.0	
7:54	2000000.0	2000000.0	27000.0	
8:54	>999999.0	390000.0	34000.0	
9:54	>1000000.0	71000.0	3100.0	
10:48	2000000.0	240000.0	24000.0	
11:52	>999999.0	380000.0	28000.0	
12:52	>200000.0	>200000.0	16550.0	

Par River Downstream of Luxulyan STW (81610186)

Time (BST)	Total Coliform (No. / 100 ml)	aecal Coliform (No. / 100 ml)	Faecal Streps (No. / 100 ml)
1:56	179000.0	124000.0	470.0
2:44	138000.0	129000.0	964.0
3:46	188000.0	186000.0	2600.0
4:45	187000.0	163000.0	1109.0
5:45	174000.0	119000.0	290.0
6:45	67000.0	7000.0	360.0
7:44	192000.0	165000.0	740.0
8:42	>200000.0	26000.0	1509.0
9:42	>200000.0	19000.0	1309.0
10:35	>200000.0	>200000.0	3200.0
11:40	>200000.0	26000.0	5200.0
12:39	>200000.0	>200000.0	2900.0

Table 9

Luxulyan STW FE Flow - 03/08/00		Glob dosing concentrations & flow - 03/08/00		
Time (BST)	Approx Flow (l/sec)	Time (BST)	<i>B.globigii</i> (No./μl)	Flow (ml/sec)
1:05	7.1	1:00	1.33E+06	0.82
1:41	14.3	1:31	9.10E+05	0.81
2:07	14.3	2:02	1.20E+06	0.81
2:40	12.0	2:31	1.66E+06	0.81
3:05	12.0	3:01	1.92E+06	0.81
3:34	6.6	3:31	1.28E+06	0.81
4:08	4.4	4:01	1.74E+06	0.83
4:34	3.6	4:30	1.76E+06	0.82
5:06	0.6	5:00	1.59E+06	0.77
5:35	2.0	5:31	1.99E+06	0.83
Flow measuring device broken		6:00	1.74E+06	0.81
8:40	8.8	6:31	1.94E+06	0.76
9:02	8.3	7:02	1.85E+06	0.78
9:40	8.3	7:32	1.62E+06	0.82
10:10	8.8	8:00	1.79E+06	0.78
10:35	7.7	8:32	1.73E+06	0.77
11:05	8.3	9:02	1.23E+06	0.77
11:37	4.5	9:34	1.50E+06	0.78
12:05	8.3	10:03	1.58E+06	0.79
12:35	10.2	10:31	1.55E+06	0.83
13:05	7.2	11:00	2.15E+06	0.71
Mean Flow	7.9	11:31	1.91E+06	0.76
		12:00	1.97E+06	0.75
		12:30	1.38E+06	0.81
		13:00	1.36E+06	0.78
		Mean No./μl	1.63E+06	0.79
		Mean No./ml	1.63E+09	Mean mls/sec
		Mean No./sec	1.3E+09	
		STW Flow mls/sec	7900.0	
		Mean No./ml in STW Flow	1.63E+05	
		Mean No./100ml in STW Flow	1.63E+07	

Table 10

Par Beach Statutory monitoring point (81614842)

03/08/00

Time (BST)	Tidal Stat	Total Coliforms (No. / 100 ml)	Faecal Coliforms (No. / 100 ml)	Faecal Streps (No. / 100 ml)	alinit (g/kg)	<i>B. Globigii</i> (No. / 100 ml)	Dilutions from Luxulyan STW
7:32		2200.0	300.0	127.0	34.2	<10.0	
8:02					34.0	<10.0	
9:00	HW				34.3	<10.0	
9:32		550.0	100.0	45.0	34.5	<10.0	
10:02					34.7	<10.0	
10:31		145.0	45.0	18.0	34.9	<10.0	
11:00					35.0	<10.0	
11:40		109.0	<10.0	18.0	35.0	<10.0	
12:00	HW+3				34.9	18.0	905556
12:31		1036.0	45.0	<10.0	33.8	1243.0	13113
13:00					31.9	6500.0	2508
13:34		4700.0	145.0	65.0	33.2	4400.0	3705
14:01		1336.0	73.0	36.0	34.1	2200.0	7409
14:30					34.2	2500.0	6520
15:02		440.0	10.0	<10.0	34.7	710.0	22958
15:32	LW				34.9	250.0	65200
16:00		27.0	<10.0	<10.0	35.0	72.0	226389
16:01					33.7	4700.0	3468
17:00		9000.0	4200.0	36.0	34.0	4900.0	3327
17:30					34.0	3600.0	4528
18:02		18090.0	3900.0	18.0	32.6	7800.0	2090
18:42	HW-3				33.9	5300.0	3075
19:10		7300.0	2800.0	18.0	34.2	3100.0	5258
19:30					34.3	1545.0	10550

Par Statutory Transect (Knee Depth)

Time (BST)	Tidal Stat	Total Coliforms (No. / 100 ml)	Faecal Coliforms (No. / 100 ml)	Faecal Streps (No. / 100 ml)	alinit (g/kg)	<i>B. Globigii</i> (No. / 100 ml)	Dilutions from Luxulyan STW
7:30		2090.0	440.0	209.0	33.6	<10.0	
8:00					33.8	18.0	905556
8:32		2100.0	1091.0	260.0	34.0	<10.0	
9:02	HW				34.0	<10.0	
9:30		390.0	100.0	73.0	34.6	<10.0	
10:00					34.6	<10.0	
10:30		370.0	118.0	45.0	34.8	<10.0	
11:02					34.9	27.0	603704
11:42		220.0	91.0	36.0	34.9	<10.0	
12:02	HW+3				34.9	<10.0	
12:32		640.0	55.0	27.0	33.9	1162.0	14028
13:02					30.3	8182.0	1992
13:32		4200.0	330.0	82.0	30.7	6700.0	2433
14:00		5200.0	290.0	55.0	32.2	8727.0	1868
14:31					33.0	5400.0	3019
15:00		760.0	36.0	10.0	34.5	1455.0	11203
15:30	LW				34.9	108.0	150926
16:02		45.0	<10.0	10.0	34.9	108.0	150926
16:33					34.1	4000.0	4075
17:02		22000.0	11270.0	100.0	29.5	25000.0	652
17:32					31.6	10364.0	1573
18:00		32000.0	8000.0	136.0	30.4	19000.0	858
18:40	HW-3				33.3	6400.0	2547
19:32					33.9	4900.0	3327

Table 11

Par Beach Western Transect (Guideline Depth)

Time (BST)	Tidal State	Total Coliforms (No. / 100 ml)	Faecal Coliforms (No. / 100 ml)	Faecal Streps (No. / 100 ml)	Salinity (g/kg)	<i>B. Globigii</i> (No. / 100 ml)	Dilutions from Luxulyan STW
7:32		680.0	280.0	65.0	34.6	<10.0	
8:02					34.9	<10.0	
9:02	HW				34.9	27.0	603704
9:38		240.0	45.0	91.0	35.0	<10.0	
10:08					35.0	<10.0	
10:36		440.0	27.0	10.0	35.0	<10.0	
11:03					34.9	<10.0	
11:42		760.0	109.0	27.0	34.4	670.0	24328
12:03	HW+3				34.3	919.0	17737
12:37		4300.0	200.0	27.0	33.3	4300.0	3791
13:02					14.3	75000.0	217
14:38					28.3	25000.0	652
15:03		5900.0	240.0	136.0	31.4	9364.0	1741
15:31	LW				31.4	10545.0	1546
16:02		14090.0	420.0	173.0	30.5	18000.0	906
17:00		44000.0	12000.0	164.0	29.9	18000.0	906
17:32					32.4	7800.0	2090
18:07		21000.0	9000.0	65.0	33.1	6200.0	2629
18:32	HW-3				34.5	1455.0	11203
19:02		1755.0	973.0	45.0	34.8	650.0	25077
19:32					34.8	790.0	20633

Par Beach Western Transect (Knee Depth)

Time (BST)	Tidal Stat	Total Coliforms (No. / 100 ml)	Faecal Coliforms (No. / 100 ml)	Faecal Streps (No. / 100 ml)	Salinity (g/kg)	<i>B. Globigii</i> (No. / 100 ml)	Dilutions from Luxulyan STW
7:30		973.0	918.0	173.0	34.4	<10.0	
8:00					34.6	180.0	90556
8:30		690.0	390.0	18.0	34.9	72.0	226389
9:00	HW				35.0	<10.0	
9:36		610.0	145.0	430.0	34.9	<10.0	
10:05					34.9	<10.0	
10:35		290.0	155.0	91.0	34.9	<10.0	
11:01					34.9	<10.0	
11:40		350.0	136.0	173.0	34.8	18.0	905556
12:01	HW+3				34.7	210.0	77619
13:00					33.5	3000.0	5433
14:30					26.7	29000.0	562
15:00		24000.0	827.0	300.0	23.0	43000.0	379
15:30	LW				19.8	58000.0	281
16:00		24000.0	760.0	173.0	25.8	35000.0	466
17:30					30.7	19000.0	858
18:05		15270.0	5600.0	55.0	34.0	4600.0	3543
18:30	HW-3				34.7	838.0	19451
19:00		25000.0	1373.0	27.0	34.9	750.0	21733
19:30					34.8	590.0	27627

Table 12

Polkerris Beach (81614829)

03/08/00

Time (BST)	Total Coliforms (No. / 100 ml)	Faecal Coliforms (No. / 100 ml)	Faecal Streps (No. / 100 ml)	Salinity (g/kg)	<i>B.Globigii</i> (No. / 100 ml)	Dilutions from Luxulyan STW
7:00	955.0	750.0	65.0	34.1	<10.0	
8:00	740.0	48.0	55.0	34.0	<10.0	
9:00	1773.0	660.0	173.0	34.0	<10.0	
10:00	420.0	230.0	27.0	34.0	27.0	603704
11:00	270.0	136.0	10.0	34.1	<10.0	
12:00	109.0	73.0	18.0	34.3	<10.0	
13:00	100.0	36.0	18.0	34.4	<10.0	
14:00	55.0	18.0	10.0	35.0	<10.0	
15:00	55.0	45.0	<10.0	34.9	36.0	452778
16:00	350.0	45.0	10.0	34.4	847.0	19244
17:00	182.0	109.0	18.0	34.3	1027.0	15871
18:00	230.0	65.0	<10.0	34.3	982.0	16599
19:00	164.0	73.0	27.0	34.3	1036.0	15734

Table 13 - Freshwater Inputs**Par River at A3082 Bridge (81610138)**

Time (BST)	Total Coliform (No. / 100 ml)	aecal Coliform (No. / 100 ml)	Faecal Streps (No. / 100 ml)
7:16	102000.0	41000.0	210.0
8:00	>200000.0	4800.0	270.0
9:14	132000.0	75000.0	570.0
10:00	112000.0	7200.0	760.0
11:02	53000.0	5900.0	750.0
12:00	79000.0	6000.0	640.0
13:02	13000.0	2900.0	350.0
14:00	41000.0	2600.0	320.0
15:03	149000.0	6700.0	891.0
16:00	>200000.0	6100.0	1045.0
17:02	>200000.0	192000.0	650.0
18:08	192000.0	94000.0	760.0
19:02	>200000.0	184000.0	760.0
19:30	127000.0	78000.0	1064.0

Treffry Canal at A3082 Bridge (81610205)

Time (BST)	Total Coliform (No. / 100 ml)	aecal Coliform (No. / 100 ml)	Faecal Streps (No. / 100 ml)
7:20	77000.0	46000.0	670.0
8:02	115000.0	58000.0	660.0
9:02	98000.0	5100.0	927.0
10:02	135000.0	42000.0	2500.0
11:04	132000.0	4300.0	680.0
12:03	101000.0	48000.0	2100.0
13:05	89000.0	4800.0	2400.0
14:02	56000.0	3000.0	740.0
15:05	59000.0	3700.0	560.0
16:02	78000.0	4200.0	680.0
17:04	>200000.0	154000.0	1151.0
18:10	186000.0	160000.0	720.0
19:04	194000.0	172000.0	918.0
19:32	195000.0	186000.0	1191.0

Table 14 - Freshwater Inputs**Par Sands - Stream A (81610603)**

Time (BST)	total Coliform (No. / 100 ml)	aecal Coliform (No. / 100 ml)	Faecal Streps (No. / 100 ml)	Salinity (g/kg)
7:05	2200.0	1491.0	640.0	5.8
9:00	4200.0	3600.0	650.0	9.4
11:24	2600.0	1091.0	540.0	3.9
13:20	2900.0	2100.0	560.0	7.7
15:23	2300.0	2300.0	800.0	4.5
17:17	2200.0	2200.0	320.0	3.3

St Blazey Stream Prior to Par River

Time (BST)	total Coliform (No. / 100 ml)	aecal Coliform (No. / 100 ml)	Faecal Streps (No. / 100 ml)
7:14	23000.0	8550.0	8180.0
9:12	52000.0	16640.0	9730.0
11:00	12820.0	8000.0	7200.0
13:00	23000.0	7100.0	6400.0
15:02	20000.0	15450.0	4200.0
17:00	9640.0	9000.0	1820.0
19:00	15550.0	8550.0	1264.0

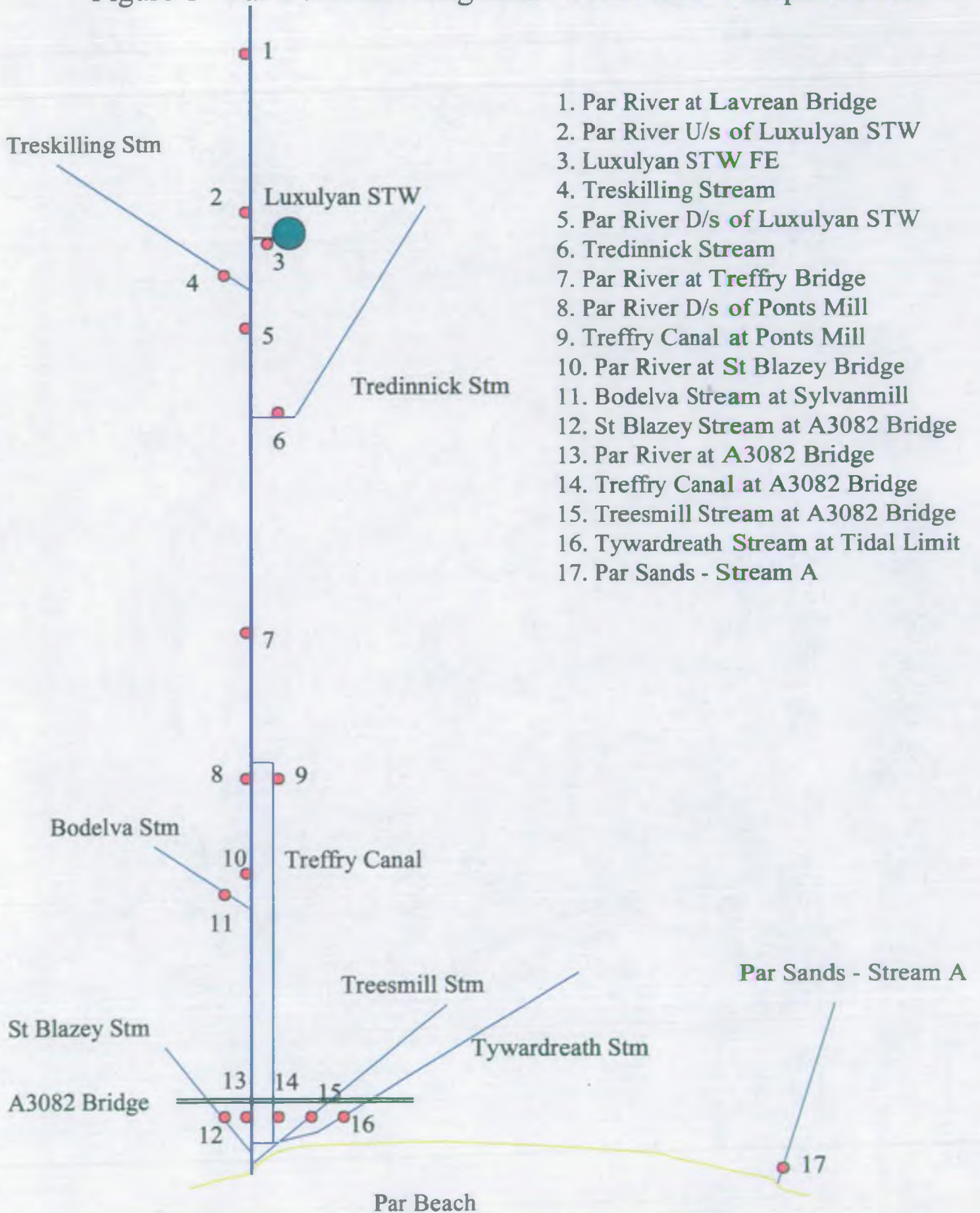
Treesmill Stream Upstream of Tidal Limit

Time (BST)	total Coliform (No. / 100 ml)	aecal Coliform (No. / 100 ml)	Faecal Streps (No. / 100 ml)
7:22	2000.0	855.0	380.0
9:23	4000.0	936.0	330.0
11:06	2300.0	945.0	127.0
13:07	2500.0	720.0	155.0
15:07	2300.0	740.0	300.0
17:06	2900.0	2800.0	250.0
19:06	3100.0	270.0	230.0

Tywardreath Stream At Tidal Limit

Time (BST)	total Coliform (No. / 100 ml)	aecal Coliform (No. / 100 ml)	Faecal Streps (No. / 100 ml)	Salinity (g/kg)
7:30	15000.0	11550.0	7200.0	<1.0
9:08	44000.0	38000.0	3600.0	<1.0
11:14	29000.0	7600.0	3200.0	3.3
13:11	10270.0	4900.0	2600.0	<1.0
15:15	8450.0	4100.0	1270.0	<1.0
17:09	6900.0	5200.0	460.0	<1.0
19:10	8730.0	7500.0	530.0	<1.0

Figure 1 - Par Beach Investigation - Freshwater Sample Points



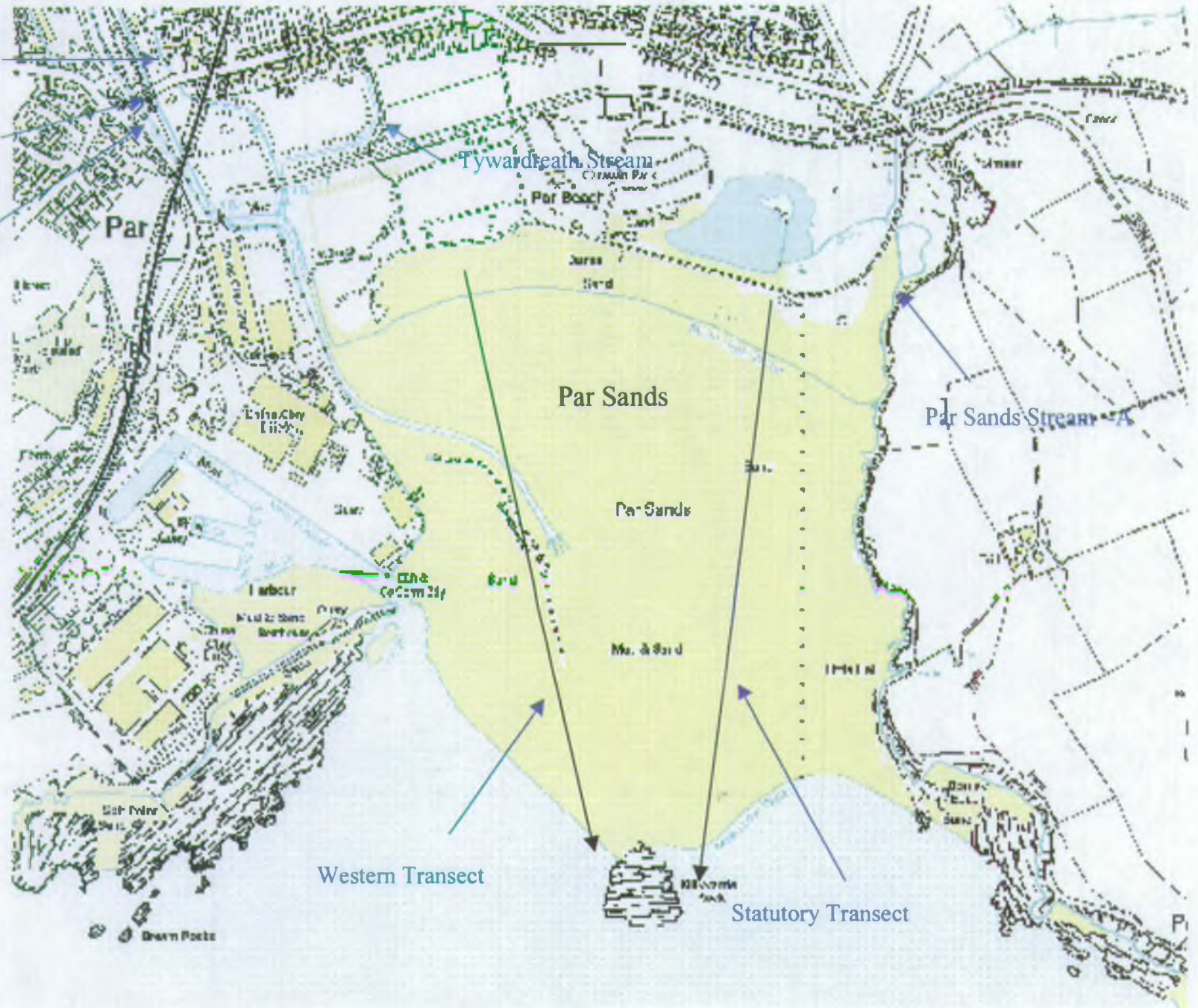
1. Par River at Lavrean Bridge
2. Par River U/s of Luxulyan STW
3. Luxulyan STW FE
4. Treskilling Stream
5. Par River D/s of Luxulyan STW
6. Tredinnick Stream
7. Par River at Treffry Bridge
8. Par River D/s of Pontois Mill
9. Treffry Canal at Pontois Mill
10. Par River at St Blazey Bridge
11. Bodelva Stream at Sylvanmill
12. St Blazey Stream at A3082 Bridge
13. Par River at A3082 Bridge
14. Treffry Canal at A3082 Bridge
15. Treesmill Stream at A3082 Bridge
16. Tywardreath Stream at Tidal Limit
17. Par Sands - Stream A

Figure 2

Treemill Stream

Par River & Treffry Canal at A3082 Br.

St Blazey Stream



Western Tract

Statutory Tract

Par Sands Stream

Par Sands

Pa Sands

Ma. & Sand

Down Posts

The Community

Lambert

St. Peter

St. Mary

St. John

St. Andrew

St. George

St. Michael

St. Nicholas

St. Oswald

St. Peter

St. Paul

St. Vincent

St. James

St. John

St. Baptist

St. Anthony

St. Francis

St. Clare

St. Elizabeth

St. Margaret

St. Mary

St. Ann

St. Catherine

St. Agnes

St. Bridget

St. Lucia

St. Rose

St. Gertrude

St. Margareta

St. Cecilia

St. Theresia

St. Agatha

St. Katerina

St. Barbara

St. Dorothea

St. Ursula

St. Euphrosina

St. Anastasia

St. Agathe

St. Veronique

St. Genevieve

St. Eustachia

St. Margareta

St. Margareta

APPENDIX 1

Register of Conditions imposed under Section 7 of the Rivers (Prevention of Pollution) Act, 1951 as extended by the Clean Rivers (Estuaries and Tidal Waters) Act, 1960 and the Rivers (Prevention of Pollution) Act, 1961.

Act under which Consent is issued or Notice is served... 1951

Date of Application	Name and Address of Applicant or Person to whom Consent is issued or upon whom Notice is served imposing or varying conditions	Full Address or other sufficient description of land or premises to which the conditions relate including reference to plans if any
13-5-1980	South West Water Authority, 3-5 Barnfield Road, Exeter, Devon, EX1 1RE.	Discharge of effluent from St. Austell North Sewage Treatment Works, Luxulyan, Cornwall, to the Par River, as described in Form P/A/1 dated 6 August 1979, and accompanying drawing numbered P/1/95/136

(a) General

The terms of this Consent will not, without the consent in writing of the person to whom this Consent is given (or his successor), be altered before the expiration of the period ending with the twelfth day of August 1982.

(b) As to outlet

The 500mm spun iron outlet shall be sited at N.G.R. SX 0442 5814 and used only for the discharge of treated sewage effluent.

(c) As to discharge

1. The effluent discharged to the stream shall not have a biochemical oxygen demand (BOD) in the presence of 0.5mg/l allyl thiourea (ATU) in 5 days at 20°C in excess of twenty milligrams per litre (20mg/l).
2. The effluent discharged to the stream shall not contain more than thirty milligrams per litre (30mg/l) of suspended solids dried at one hundred and five degrees centigrade (105°C).
3. The effluent discharged to the stream shall not have a pH value greater than 9(nine) or less than 5(five).
4. The maximum rate of discharge of effluent to the stream shall not exceed four hundred and fifty-four point six (454.6) cubic metres (100,000 gallons) in any one hour.
5. The volume of effluent discharged to the stream under dry weather flow conditions shall not exceed two thousand seven hundred and twenty-seven point six (2727.6) cubic metres (600,000 gallons) in any period of twenty-four (24) hours.

RECORDED

Deemed to have been granted by the Secretary of State under S.6 of the Water Authorities (Control of Outlets and Discharges) Regulations 1975.

R. L. Gray

Date of Consent or Notice... 13 August 1980...

XXXXXXXXXXXXXXXXXXXX

3-5 Barnfield Road Exeter

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