WASP Review Part 3: Are sewage discharges reported accurately and openly by water companies?

Peter Hammond, Windrush Against Sewage Pollution (WASP), September 19th 2022

EXECUTIVE SUMMARY

The detection and recording of storm overflow discharges are fundamental to the UK Government's *Storm Overflows Reduction Plan* and the annual *Environmental Performance Assessment* (EPA) of the water industry by the environmental regulators in England (EA) and Wales (NRW) which influences oversight by Ofwat, the economic regulator. By 2024, all storm overflows have to be fitted with Event Duration Monitors (EDMs) to detect untreated sewage discharges (spills) so that Water and Sewerage Companies (WaSCs) can report summary spilling hours and frequency to the EA and NRW.

WASP offers evidence here that WaSCs cannot be trusted to report spills accurately and openly, even with EDMs fitted, so spill incidence is under reported and regulation of permits to discharge to watercourses is suboptimal. Hence, the EPA and Ofwat's economic planning are based on incomplete and incorrect data. Specifically,

a) self-reporting allows WaSCs to suppress spill data and hide non-compliance with discharge permits;
b) WaSCs use minor monitor malfunction as an excuse to withhold spill data and/or hide non-compliance;
c) WaSCs cite EA and OFWAT investigations as an excuse to withhold data and avoid scrutiny by NGOs;
d) summary data sent to regulators can be inconsistent with detailed WaSC data obtained by FOI request;
e) Jan-Dec reporting breaks the Oct-Mar spilling season enabling WaSCs to hide long spills across two years;
f) spill data for storm tank overflows at sewage works can be inconsistent with treatment data;
g) WaSCs exploit continued confusion about spilling during no or low rainfall;
h) spill monitor installation and maintenance has been, and in some cases, continues to be unsatisfactory;

WASP has evidence of incorrect/unreliable spill data submitted to regulators at 25 STWs, including

Anglian Water	Canvey Island STW (2019, 2020, 2021); Ely New STW (2018, 2019, 2020*, 2021*)
Northumbrian	Hendon STW (2018-2020)
Severn Trent	Hodsock STW (2020, 2021)
Southern Water	Lavant STW (2020)
South West Water	Chudleigh (2021); Honiton (2019, 2021)
Thames Water	Burford STW (2021*); Henley STW (2018,220); Woodstock STW (2019-2021)
United Utilities	Ambleside STW (2021); Coniston (2918,2019,2021); Hawkshead SPS (2021)
Welsh Water	Builth Wells STW (2020), Ruthin (2020)
Wessex Water	Tetbury STW (2018, 2019)
Yorkshire Water	Wentworth STW (2021)

where * denotes a WaSC's self-admission of inaccuracy. Based on anomalies identified in the EDM data submitted to regulators and the lack of transparency of some WaSCs, WASP suggests that:

1) self-reporting of spill data by WaSCs should not continue;
2) the EA and NRW must thoroughly validate spill data against rainfall and sewage treatment data;
3) Ofwat must demonstrate that it rigorously reviews the EA and NRW validation of EDM data;
4) detailed WaSC sewage treatment and spill data should be freely available online[1];
5) EDM devices should be certified by a wholly independent body as for meters measuring sewage treatment;
6) the Information Commissioner's Office should investigate WaSCs who withhold spill data; e.g., Severn Trent Water and United Utilities, rated by the EA as industry leading, withheld data for 4,500 overflows.

While producing this short review of WaSC-reported spill data, WASP believes that there was sufficient accuracy to identify **1,516 days** with illegal sewage spills not previously reported by WASP.

[1] Rainfall and sewage treatment data are needed to check reliability of EDM data and validate WaSC compliance with EA permits.

BACKGROUND

There are over 16,000 storm overflows in England and Wales. In 2020, with 80% of storm overflows monitored and reported to the EA, there were 400,000 sewage discharges, totalling over 3M hours. Similarly, in 2021, with 89% of storm overflows monitored, there were 370,000 sewage discharges, totalling 2.7M hours. Crucially, volume of discharge is not required to be recorded.

In 2021, WASP provided both written[2] and oral evidence[3] to the *Water Quality in Rivers* review of the House of Commons Environmental Audit Committee (EAC) and recommended that storm overflows be fitted with volume flow meters. Volumetric data would support scientific studies of environmental effects, estimates of discharge dilution and be a basis for fines or levies on spills.

WASP's recommendation of volumetric metering of spills was endorsed by the EAC in its final report[4], but, in May 2022, was rejected by the UK Government.

Now, without volumetric data, the primary record of storm overflow activity will be EDM detection of spill start and stop times. Therefore, EDM data are crucial to the EA's annual environmental performance assessment (EPA) of WaSCs and to Ofwat's economic regulation of the water industry.

In March 2022, the Department for Environment, Food and Rural Affairs (DEFRA) announced a consultation[5] on its *Storm Overflows Reduction Plan*. The consultation document includes targets to reduce sewage discharges (Table 1). The Environment Act 2021 placed a duty on the Secretary of State at DEFRA to present the plan to Parliament by Sept 1st 2022. It was published on Aug 26th [6].

Table 1: Targets to be achieved By DEFRA's Storm Overflows Reduction Plan

Year	2030	2035	2040	2045	2050
% of high priority site storm overflows improved	38%	75%	87%	100%	100%
% of total storm overflows improved	14%	28%	52%	76%	100%
Indicative spill reductions*	44,000	84,000	160,000	240,000	320,000

*assessment based on spills numbers from EDM 2020 data

The future assessment of whether these targets have been achieved will rely wholly on EDM spill data submitted by the water companies to the EA. 2020 EDM data are especially important as they will be used as a baseline. A fundamental issue, then, is whether EDM spill data submissions are, and will continue to be, complete, accurate and informative.

In this report, we demonstrate that if the past is anything to go by, none of these is guaranteed. In fact, WASP would argue that reliability of data is seriously at risk. Therefore, if WaSC self-monitoring of sewage treatment quality and self-reporting of spills are not scrapped it will be even more essential for the EA and Ofwat to scrutinise EDM submissions with much greater rigour.

Three issues WASP believes to be of importance are the following:

(1) SUMMARY STORM OVERFLOW DATA SUBMITTED ANNUALLY TO THE ENVIRONMENT AGENCY

By the end of March each year, WaSCs are required to submit to the EA, for every EDM installed on a storm overflow, the following summary data for the previous calendar year:

[2] https://committees.parliament.uk/writtenevidence/22501/pdf/

[3] https://committees.parliament.uk/oralevidence/2076/pdf/

[4] https://committees.parliament.uk/publications/8460/documents/88412/default/

[5] https://consult.defra.gov.uk/water-industry/storm-overflows-discharge-reduction-plan/

[6] https://www.gov.uk/government/publications/storm-overflows-discharge-reduction-plan

a) the total number of spilling hours recorded;
b) the number of spills recorded in blocks or series, in terms set out by the EA;
c) the percentage of the reporting period that the EDM is in active and working accurately;

The summary EDM spill data are published by the EA shortly after the reporting deadline. All WaSCs now publish online the summary EDM spill data that they have submitted to the EA.

The 2021 EDM submissions to the EA required inclusion of the location of each storm overflow: on the sewerage network; at a sewage pumping station (SPS); at the inlet to a STW; or, on a storm tank (**Fig**. 1). These data emphasise the variation between WaSCs in the opportunity for spills to occur at different locations in the sewerage network. 60% of the reported overflows are on the sewerage network while only 20% are at SPSs and 20% at STWs.

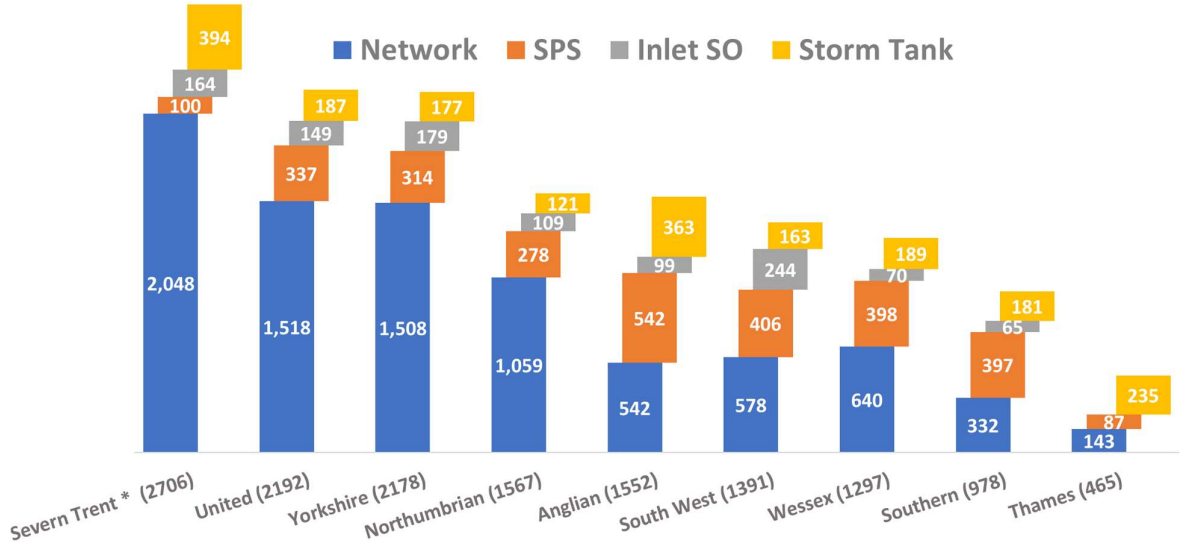


Figure 1: 14,326 storm overflows by type/location in EDM data submitted by 9 WaSCs in England in 2020
Data source: https://www.data.gov.uk/dataset/19f6064d-7356-466f-844e-d20ea10ae9fd/event-duration-monitoring-storm-overflows-annual-returns

(2) **DETAILED START-STOP TIMES OF INDIVIDUAL SPILLS OF UNTREATED SEWAGE**

Water companies do not have to submit detailed start-stop times of individual sewage spills to the EA and need only provide them when the EA requests them. Currently, in order to obtain the detailed EDM start-stop times, an Environmental Information Regulation (EIR) request has to be submitted to WaSCs by individuals outside the EA. It typically takes 1 to 2 months to receive the data and sometimes the request is refused and data is withheld. If the requester disagrees with a WaSC's response, an internal company review has to be requested (a further delay of 1 or 2 months) before continued dissatisfaction can be reported to the Information Commissioner's Office (with a 6 month waiting list for an inspector even to be nominated to investigate a dispute).

In order to validate the summary spill data for a storm overflow for a STW, WASP compares individual spill start-stop times with 15-min interval measures of sewage treatment flow at that STW. Although the EA requires WaSCs to record sewage treatment flow at 15-min intervals, **it only requests submission of daily totals of sewage treated**. As with spill data, the detailed sewage treatment data are obtained via EIR requests with similar delays in provisions and risk of refusal.

Over the past 4 years or so, WASP has obtained detailed EDM spill data and sewage treatment flow data for thousands of STWs across 10 WaSCs in England and Wales. Specifically, for 2020 and 2021,

WASP succeeded in obtaining individual start-stop times for discharges of untreated sewage for all storm overflows operated by 8 WaSCs. **Severn Trent Water** and **United Utilities** refused the request.

Indeed, WASP has found that **Severn Trent Water** and **United Utilities** stand out as lacking transparency and openness on data sharing in the responses they have made to EIR requests. For example, investigations of water companies announced in Nov 2021 by the EA and OFWAT are regularly used by them and, on occasion, by other WaSCs as an excuse to withhold data.

(3) **ANNUAL ENVIRONMENTAL PERFORMANCE ASSESSMENT OF WaSCs**

Since 2011, the EA has published an annual environmental performance assessment (EPA) where 6 metrics for evaluating all WaSCs in England and Wales are aggregated into an overall star rating of 1-4 stars: 1*= poor across the board; 2*=requires much improvement; 3* = good; 4*=industry leading.

Figure 2 shows how each company has fared over the past 12 years. Several metrics are based on the spills declared by a WaSC but not on spill compliance in terms of spilling only during rainfall and while maintaining treatment capacity. One of the metrics is used to summarise compliance of self-reported monitoring of the quality of treated sewage (final effluent) leaving an STW.

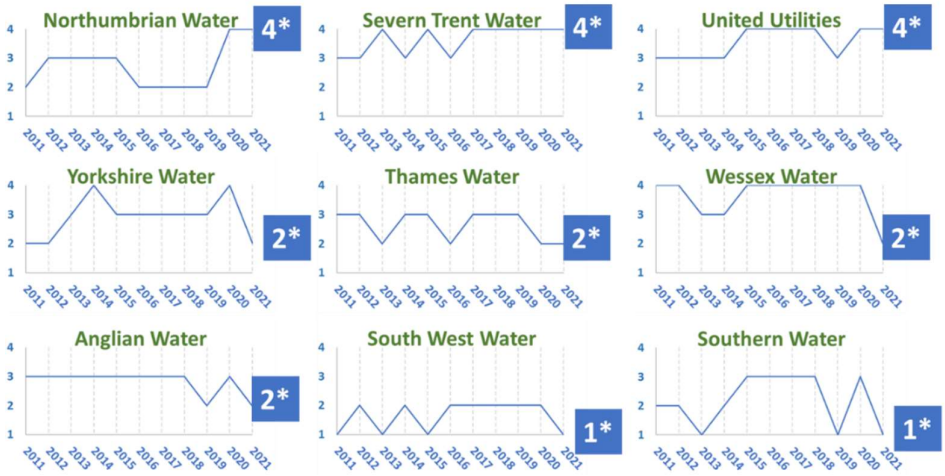


Figure 2: star rating in EA's Environmental Performance Assessment of 9 WaSCs in England (2011-2021)

By way of comparison, not-for-profit Welsh Water is assessed by NRW and achieved 3* every year apart from 2011 (1*), 2017 (2*) and 2020 (4*). South West Water has never achieved higher than 2*. It is interesting to note that, in WASP's experience, the 3 WaSCs in England with a 4* rating for 2021 have been the least open in terms of sharing data and responding positively to EIR requests. Two of them, Severn Trent Water and Northumbrian Water, have not previously been included in a WASP report because of the difficulty previously in obtaining spill and sewage treatment data from them. Severn Trent Water even ignores EIR requests which itself is illegal. Northumbrian Water has been more co-operative of late.

WASP'S VALIDATION OF THE SUMMARY SPILL DATA SUBMITTED BY WaSCS TO THE EA AND NRW

In order to validate the summary spill data submitted by WaSCs to the EA and NRW, WASP compares the start-stop times of individual spills with sewage treatment, daily rainfall and sometimes river flow or river level data. Table 2 catalogues validation results for the period 2018-2021 for 40 STWs

for which WASP has been able to obtain relevant data not already covered by the two previous parts of WASP's review[7,8] Each year's EDM submission is rated as follows:

incorrect	WASP believes it can infer the summary spilling data submitted to the EA to be incorrect
unreliable	there is inconsistency between individual spill, sewage treatment and rainfall data
consistent	summary spill data are consistent with individual spill, sewage treatment and rainfall data
withheld	individual spill or sewage treatment data have been withheld by a WaSC

Where WASP believes individual spills are consistent with sewage treatment and/or rainfall data but are non-compliant with a discharge permit, the number of discharge permit breaches is also estimated. Detailed analyses supporting these findings are provided after the summary table.

WHO IS INVESTIGATING WHOM?

There are currently 6 announced investigations (the EA of WaSCs; Ofwat of WaSCs; the House of Lords of Ofwat; the OEP of the EA, of Ofwat and of the Secretary of State at DEFRA) and 2 High Court Actions for instigating Judicial Review (WildJustice for Ofwat; WildFish for DEFRA's storm overflows reduction plan) summarised in **Fig**. 3.

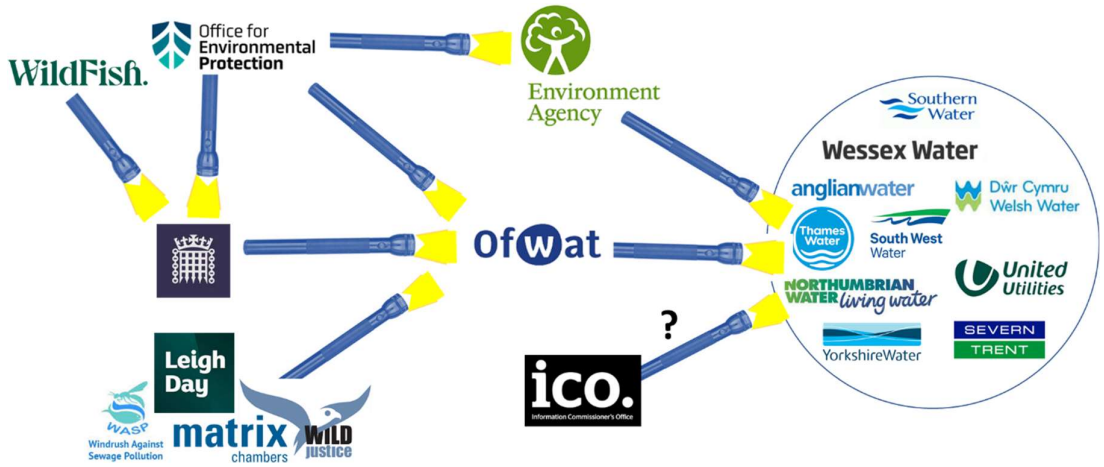


Figure 3: 6 investigations (OEP of Ofwat, of the EA and of SoS at DEFRA; House of Lords of Ofwat; the EA and Ofwat of WaSCs) and 2 pending High Court Actions for instigating Judicial Review (Wild Fish of DEFRA and Wild Justice of Ofwat); what is missing is an ICO investigation of open data and transparency by WaSCs

An urgent, missing investigation is of WaSCs who persistently refuse to allow their spilling of untreated sewage to be open to public scrutiny, especially those WaSCs who refuse freedom of information requests and use the EA and Ofwat investigations as an excuse for wholescale withholding data. Severn Trent Water and United Utilities are the worst offenders. The obvious party to undertake such an investigation of openness and data transparency is the Information Commissioner's Office (ICO).

ACKNOWLEDGEMENTS

WASP would like to thank campaigners, journalists and broadcasters who provided data and highlighted STWs or rivers needing attention. They are acknowledged where they have agreed to be identified. Most WaSC EIR staff were helpful with data requests and WASP is grateful to individual staff who prepared significant amounts of information.

[7] WASP REVIEW OF UNPERMITTED SPILLS FROM SEWAGE TREATMENT WORKS – Part 1 Thames Water

[8] WASP_REVIEW_OF_UNPERMITTED_SPILLS_FROM_SEWAGE_TREATMENT_WORKS – Part 2

Table 2: WASP Review of Reliability of Water Company Submissions of EDM Spill Data to the EA

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

number in cell = number of days when WASP believes it can infer that the data is reliable and **illegal spills** occurred

Water Company	Location STW/SPS	Watercourse	2018	2019	2020	2021	TOTAL
ANGLIAN	Badwell Ash	River Sapi/Stowlangtoft stream	14	16	10	8	48
	Belaugh	River Bure*			6	14	20
	Burnham Market	River Burn			23	100	123
	Canvey Island	River Thames (lower)		0	0	15	15
	Clacton	North Sea				22	22
	Ely New	River Ouse	8	0	4	4	16
	Fakenham	River Wensum*		4	5	15	24
	Odell	River Great Ouse				8	8
NORTHUMBRIAN	Allendale	River East Allen			15	19	34
	Hendon	North Sea		14	19	6	39
	Tudhoe Mill	River Wear (trib.)		6	4		10
	Vinovium	River Gaunless/Wear			37		37
	Willington	River Wear			11		11
SEVERN TRENT	Claymills	River Trent	10	20	6		36
	Hodsock	Langold Stream					
	Lydney	Severn Estuary					
	Tewkesbury	River Avon		12	13		25
	Upton-on-Severn	River Severn	2	6	6		14
	Withheld data for over 2,500 storm overflows						
SOUTHERN	Lavant	River Lavant*			78	72	150
	Bexhill-on-Sea	English Channel	12	8	16		36
SOUTH WEST	Bere Alston	River Tamar			25	16	41
	Chudleigh	Trib of and River Teign			11	12	23
	Ivybridge	River Erme	20	18	13	12	63
	Honiton	River Otter			26		26
	Par	St Austell Bay					
	Sidmouth	River Sid					
	St Austell	River Par					
THAMES	Burford	River Windrush				1	1
	Bicester	Langford Brook			5	4	9
	Henley	Fawley Court Stream	2		7		9
	Woodstock	River Glyme				1	1
UNITED UTILITIES	Ambleside	River Rothay / L Windermere	22	15			37
	Coniston	Church Beck/Coniston Water		19			19
	Hawkshead SPS	Black Beck/Esthwaite Water	34	37			71
	Near Sawrey	Black/Cunsey Beck		20		23	43
	Withheld data for over 2,000 storm overflows						
WELSH	Builth Wells	River Wye	10	15	50	23	98
	Ruthin	River Fawley Court Stream	3	22	61	29	115
	Llannon	River Morlais	18	17	118	101	254
WESSEX	Tetbury	Tetbury Avon	3	13	8		24
YORKSHIRE	Wentworth	Trib of Harley Dyke	3	6	0	5	14
		* chalk stream			**TOTAL ILLEGAL SPILLING DAYS**		1,516

ANALYTICAL APPROACH

For the analysis of historical data before EDM devices were installed at sewage works, WASP employed machine learning techniques to detect sewage spills that had not previously been reported by WaSCs to the EA[9]. In this and the previous two WASP review reports referred to immediately above, machine learning techniques are not used.

In each of the three WASP review reports, where EDM data are available, simple timeline charts are used to visualise individual spills against a background of sewage treatment data and the level of treatment corresponding to the treatment capacity (sometimes referred to as the storm overflow rate or *minimum* flow to treatment). Where they are available, rainfall and river level/flow data are also included to provide a fuller picture of treatment and spilling activity. Inconsistencies between these different datasets can identify where spill data may be unreliable. Where EDM spill data are not available, the same charts can reveal where spills may be inferred.

In response to an earlier draft of this report, several WaSCs pointed out that the EA allows an error on meters measuring sewage treatment of ±8% and that instead of comparing flow to treatment with 100% treatment capacity of a STW when testing permit compliance, the comparison should be with 92% treatment capacity as the meter might be underplaying the true value. Of course, the meter may be overplaying the true value and the comparison would then be 108%. In fact, WASP typically uses a very conservative and generous 90% of the treatment capacity of the comparator for flow to full treatment. Where flow to full treatment data is not available and only final effluent flow data is provided, WASP typically uses a similarly conservative 67% of treatment capacity as the comparator to allow for a 25% difference between flow to full treatment and final effluent plus an 8% meter error.

For the detection of spills during dry periods, WASP employs a conservative approach of requiring there to have been zero rainfall on the day before the spill and also on the day of the spill. This has been influenced by discussion with EA staff and by EA guidance for determining groundwater infiltration into sewer pipes:

> *Do not calculate infiltration for the first day after it has rained or after there has been significant snow melt (the flows measured may contain significant runoff or snow melt from the previous day).*

In response to an earlier draft of this report, Severn Trent Water suggested that "EA expert analysis says 5 days" allowance. Requiring 5 days without rain before determining a spill has occurred during no rainfall seems to WASP to be unreasonable and WASP would like to see evidence of that "EA expert" opinion. This suggestion is not consistent, for example, with flow to full treatment related permit breaches in the EA's *Compliance Classification Spreadsheet* provided to WASP in response to data request THM184412: one for spilling after 2 days with no rain and the other for a spill occurring "despite 7 days of minimal rainfall".

Record Number	Permit Number	Permit Holder	Reason for Classification
213600	TEMP.2997	THAMES WATER UTILITIES LTD	Storm discharge made despite no rainfall failing in previous two days
191452	TEMP.2997	THAMES WATER UTILITIES LTD	Storm dicharge occuring in despite mimimal rain for seven days.

Severn Trent Water also made a rather naïve comment that

> *the report itself very clearly states many of the conclusions are belief and not fact*

The use of the phrases "WASP believes" or "WASP beliefs" throughout the report are indicating where WASP has made an inference from data or facts expressed in spill and treatment data provided by a WaSC. For example, the inference that a spill has occurred early is a conclusion that has to be inferred from the start-stop times of an individual spill and the treatment flow data during that spill. WASP has to believe the WaSC data is factually correct so it can believe in the inference concluded. An inference is not usually a fact.

[9] https://www.nature.com/articles/s41545-021-00108-3.pdf

DETAILED ANALYSIS

ANGLIAN WATER (AW)

According to the 2021 spill data submissions, Anglian Water (AW) has been by far the least efficient water company in the installation of EDM monitors on its storm overflows. Less than 55% have been fitted with an EDM device with little more than a year to go to the 2024 deadline. As the detailed analysis shows, AW has submitted both unreliable and incorrect sewage treatment and EDM spill data to the EA.

Badwell Ash STW - ANGLIAN WATER (AW)

EDM SUBMISSION TO EA					
year	hours	spills	active	comments	WASP beliefs/facts
2018					*14 illegal spilling days (estimated)*
2019	432	39	99.82%		16 illegal spilling days
2020	1,122	67	99.92%	Under investigation	10 illegal spilling days
2021	1,074	68	99.94%	N/A Ongoing investigation	8 illegal spilling days

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Table 1: summary data submitted by AW to the EA compared to that derived by WASP from the detailed data it requested and obtained by EIR from AW

Badwell Ash STW treats sewage for a population equivalent of about 2,200 and discharges to the River Sapi. The EDM was commissioned in 2019.

2021

The individual spill start-stop times for 2021 are consistent with the daily rainfall data and the summary EDM submission to the EA. WASP believes that illegal dry spills occurred on at least 8 days. As sewage treatment data had not been acquired for 2021, it was not possible to check for "early" spilling.

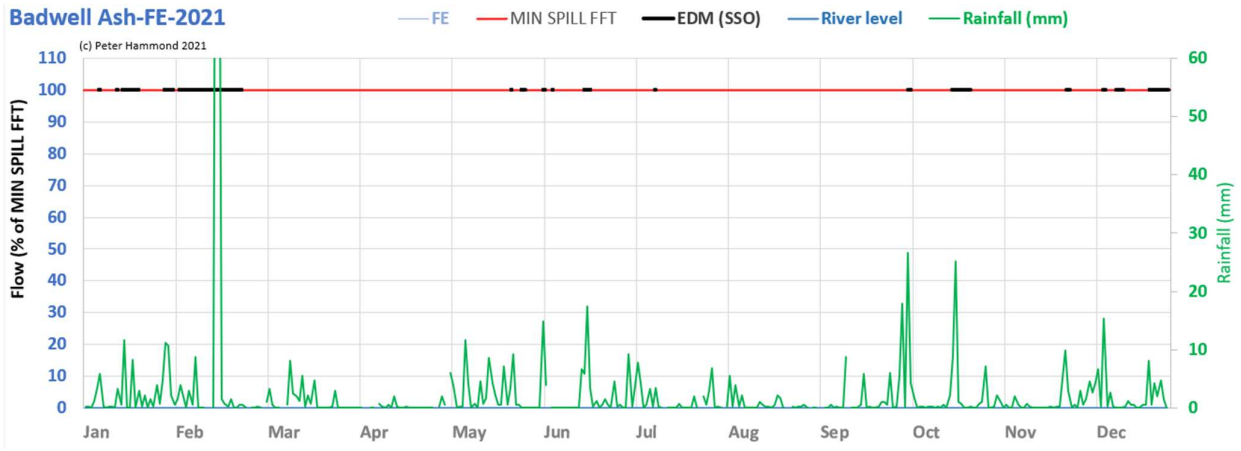


Figure 1: 2021 overview chart showing individual spills and daily rainfall

The rainfall data for February 13-16 2021 may not be reliable and WASP has been unable to consult an alternative source to verify such an extreme daily amount of rainfall. Apart from those unusual days, there do appear to be 8 illegal dry spilling days on Jan 16; Feb 9,10,21; May 29; Oct 25; Dec 15,16. Those in February 2021 are shown in **Fig**. 2

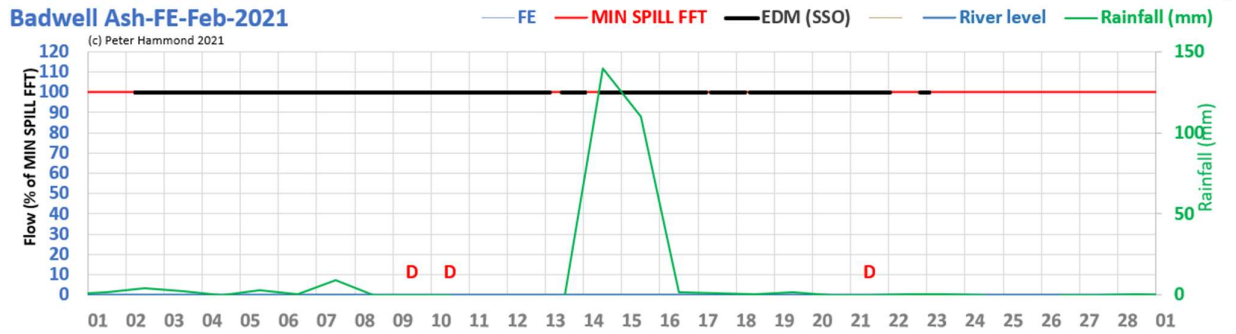


Figure 2: 3 examples of illegal "dry" spills believed by WASP to have occurred at Badwell Ash STW in Feb 2021

2020

The 2020 overview for Badwell Ash STW suggests the spills in the early part of the year are reasonably consistent with the treatment and rainfall data.

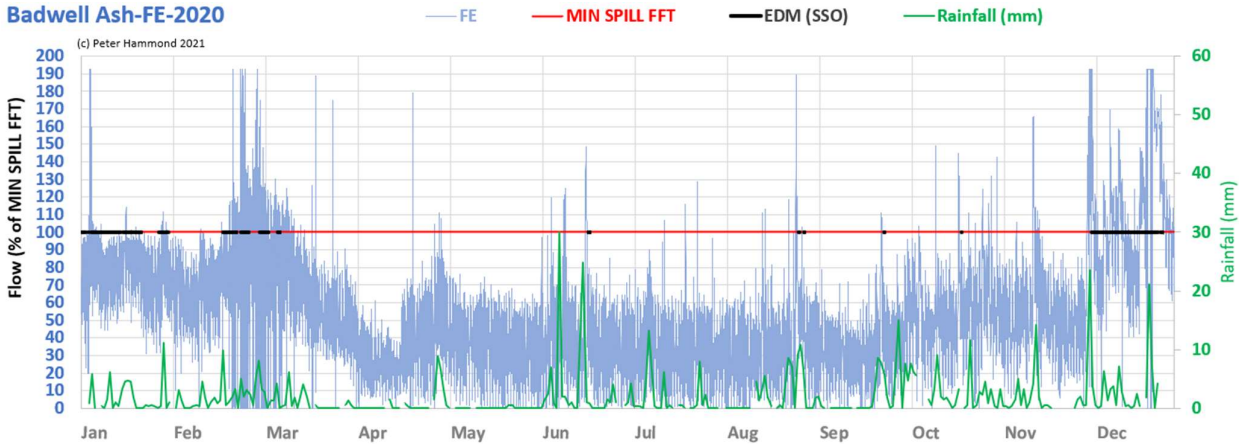


Figure 3: 2020 overview of treatment, spill and daily rainfall data for Badwell Ash STW for 2020

However, the December 2020 data looks particularly inconsistent in the middle of the month (**Fig**. 4).

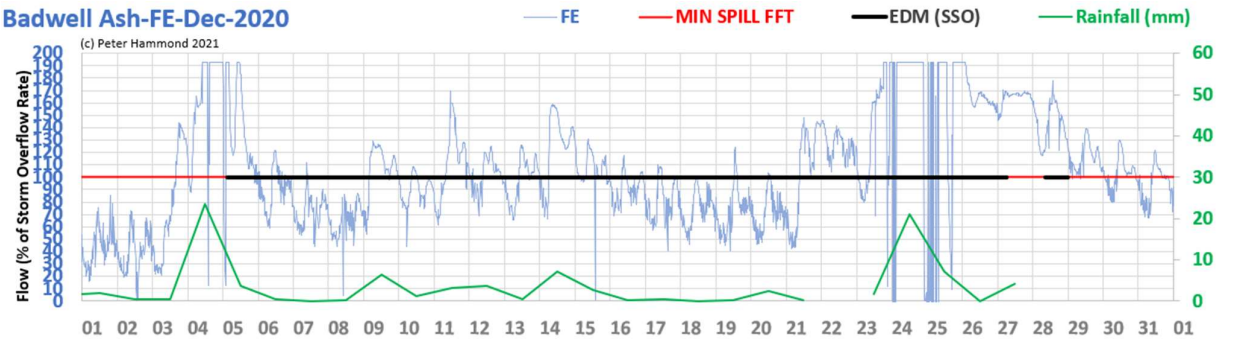


Figure 4: Dec 2020 chart showing inconsistencies between treatment, spill and rainfall data at Badwell Ash STW

The sewage treatment data does not reflect the long spill between December 5th and December 27th provided by YW in detailed EDM spill data. So either the EDM record is incorrect or there were at least 8 early and 2 dry illegal spilling days that month alone (**Fig**. 5).

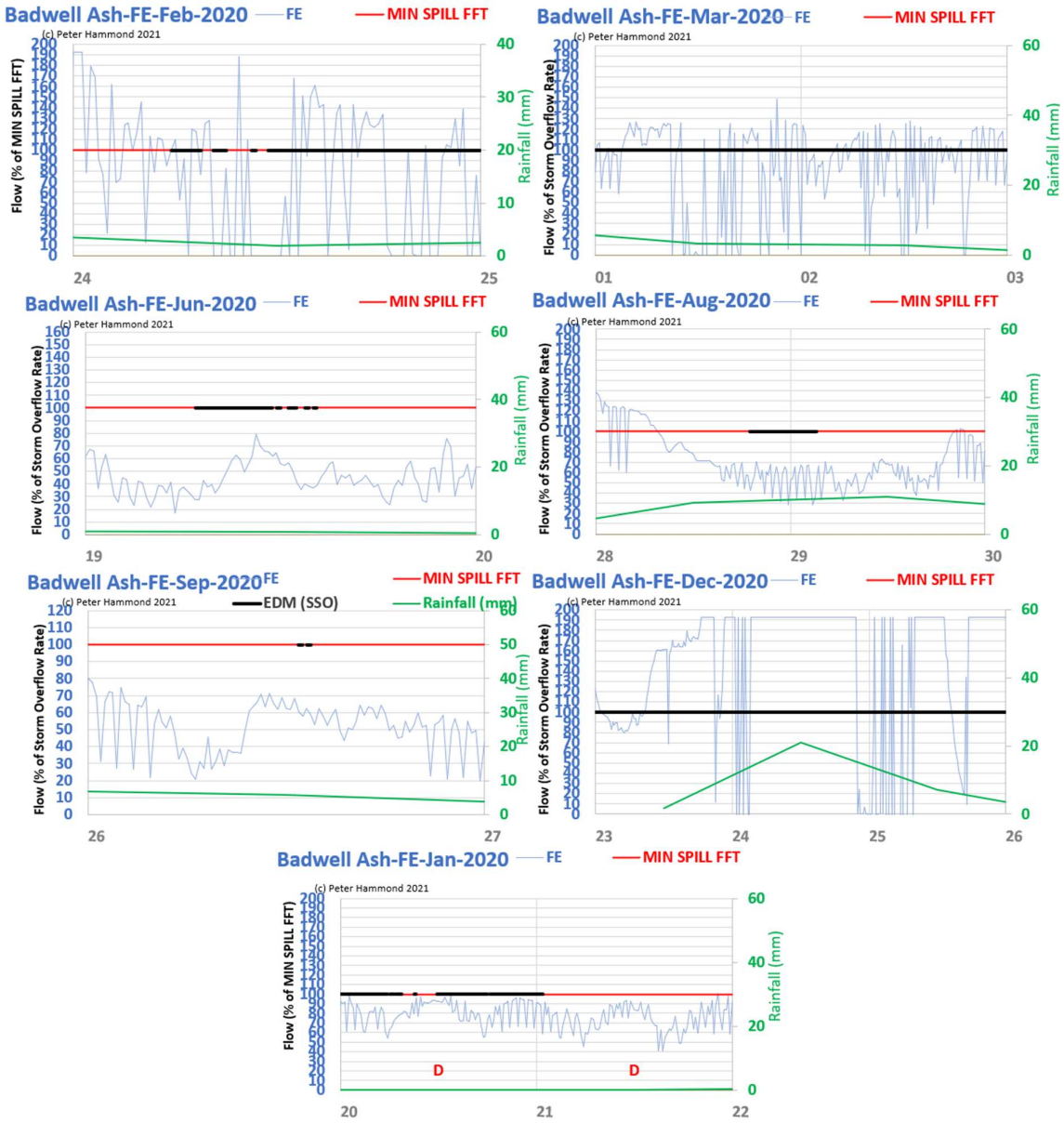


Figure 5: WASP believes there were 8 illegal spilling days at Badwell Ash STW if the detailed EDM spill data is correct

2019

WASP believes there were spills in the early part of 2019 before the EDM device was installed (**Fig**. 6).

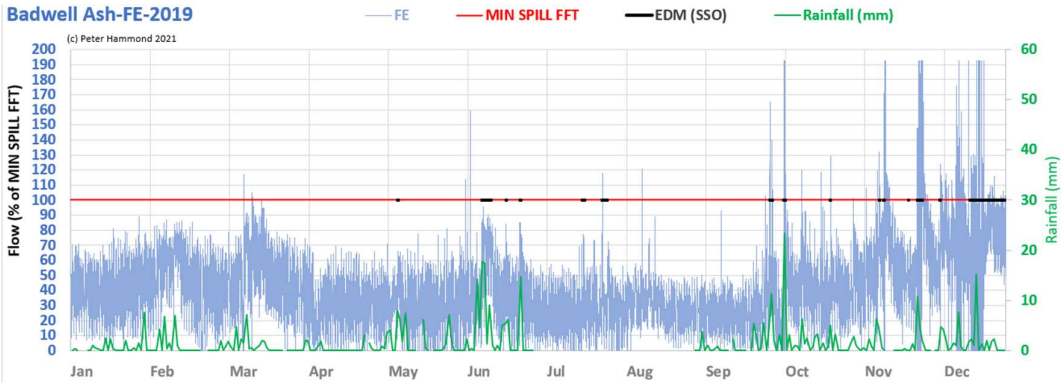


Figure 6: 2019 overview chart of treatment, EDM spill and daily rainfall data at Badwell Ash STW

WASP believes that in 2019 the detailed spill data is reasonably consistent with the treatment and daily rainfall data (**Fig**. 6) and also that there were 16 illegal spilling days in 2019 at Badwell Ash STW (**Fig**. 7)

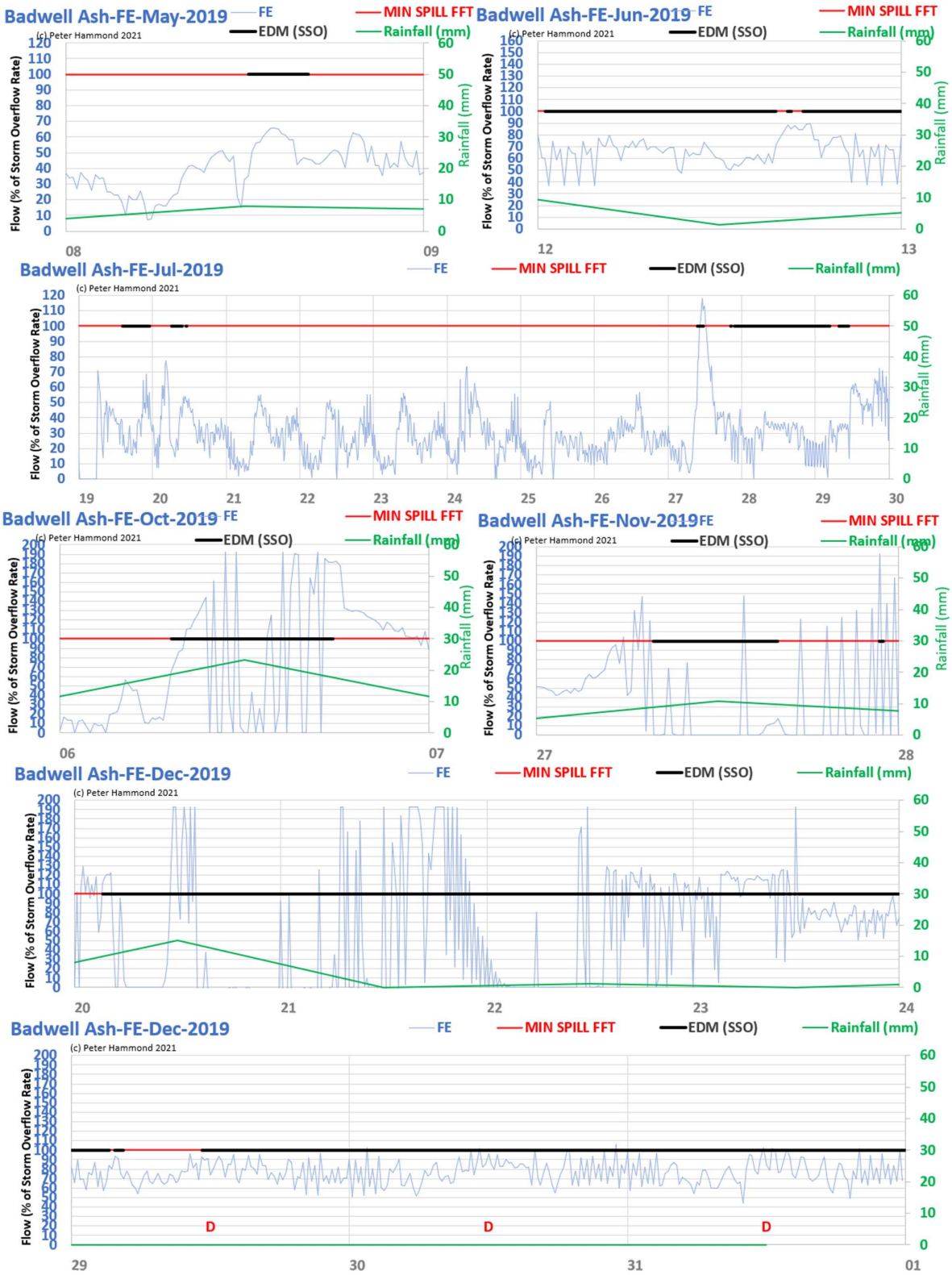


Figure 7: WASP believes there were 16 illegal spilling days at Badwell Ash STW in 2019 (May 8; Jun 12; July 19,20,27-29; Oct 6; Nov 27; Dec 20-23,2931)

2018

There is no EDM data available for Badwell Ash STW for 2018. However, using the EDM and treatment data for 2019 onwards as guidance, WASP believes there were 14 illegal early spilling days.

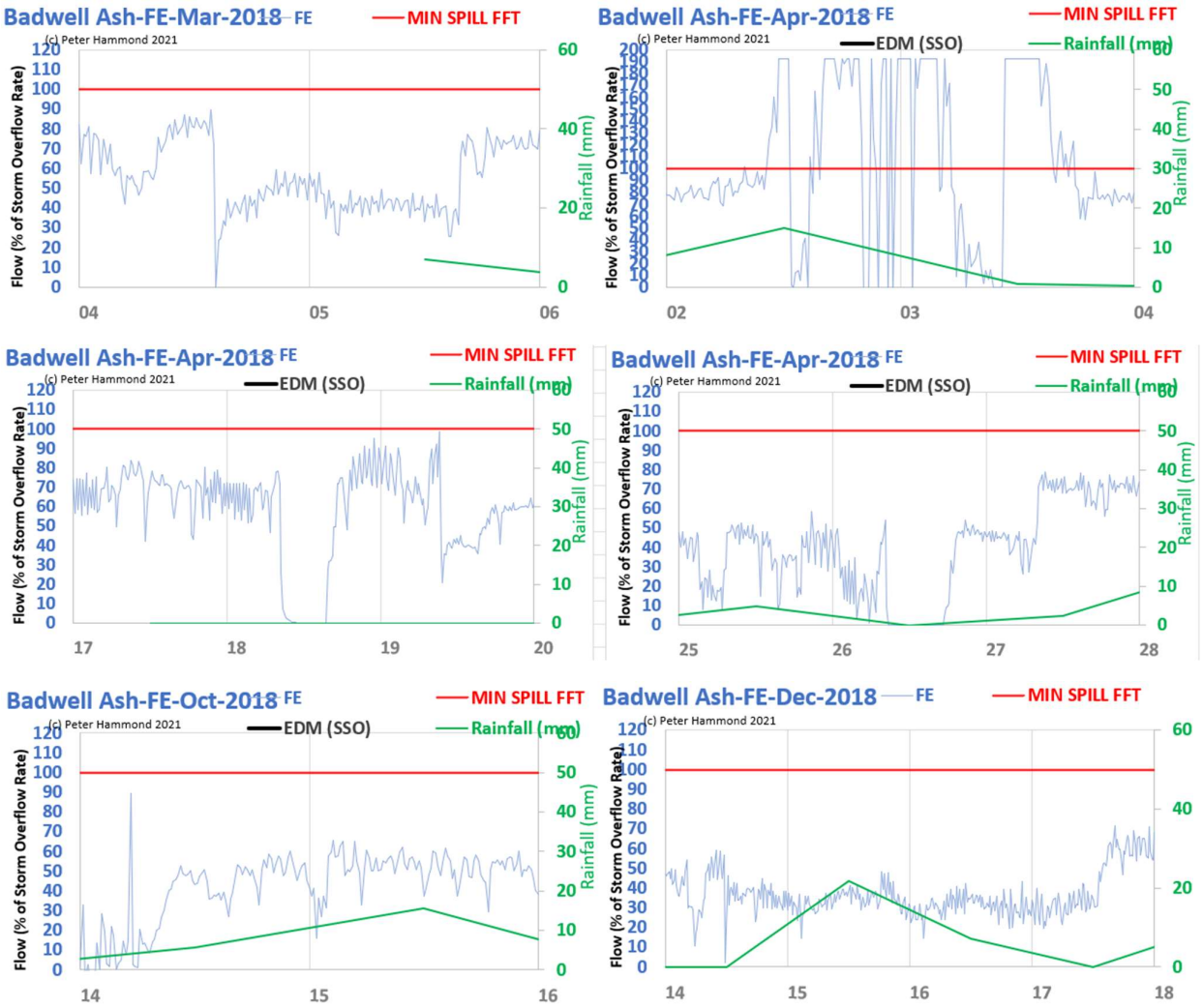


Figure 8: WASP believes there were 14 illegal spilling days at Badwell Ash STW in 2019 (Mar 4,5; Apr 2,3,18,19,25-27; Oct 14; Dec 14-17)

Belaugh STW – ANGLIAN WATER (AW)

year	EDM SUBMISSION TO EA hours	spills	active	comments	WASP beliefs/facts
2018					
2019	0.5	1	100.00%		
2020	327	28	100.00%		6 illegal spilling days
2021	1749	96	100.00%	Data collection - Tidal / river inundation N/A - Ongoing investigation	14 illegal spilling days

Table 1: EDM annual summary spill data submitted to EA by Anglian Water for Belaugh STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Belaugh STW serves a population equivalent of 9,000 and discharges to the River Bure, a chalk stream and one of the four main rivers feeding the Norfolk Broads.

2020

WASP believes there were 6 illegal early spills at Belaugh STW in 2020 (**Fig**. 1).

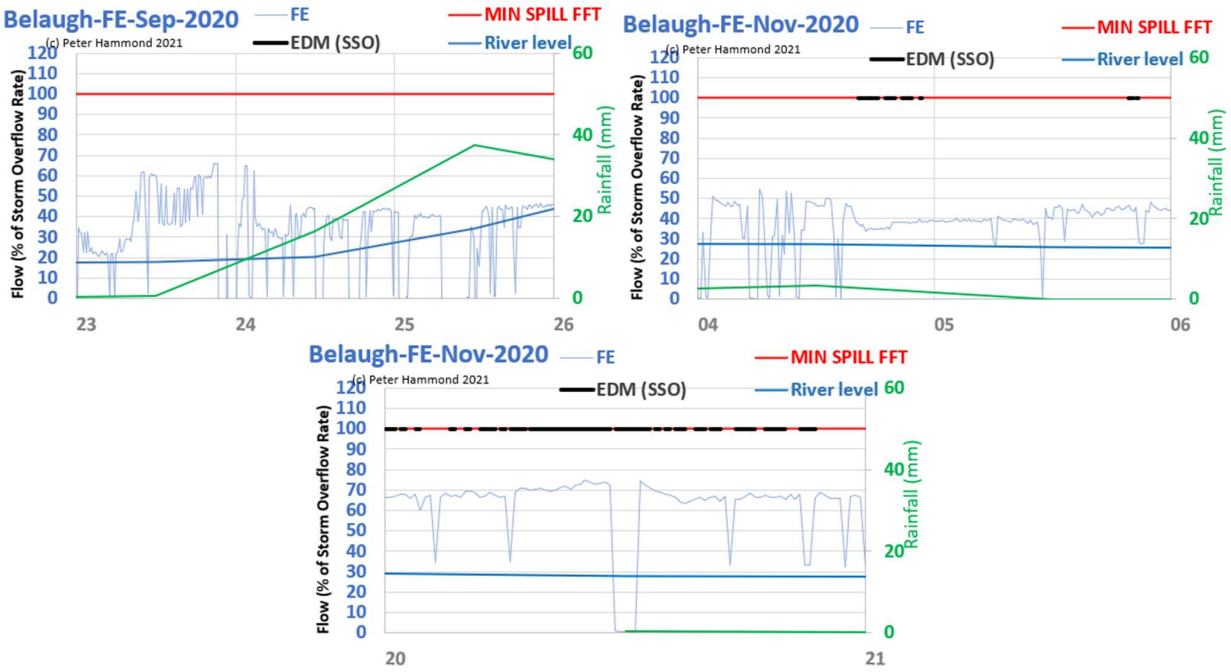


Figure 1: WASP believes there were 6 illegal spilling days at Belaugh STW in 2020

2021

The 2021 overview illustrates the very "noisy" flow to full treatment and treated effluent curves.

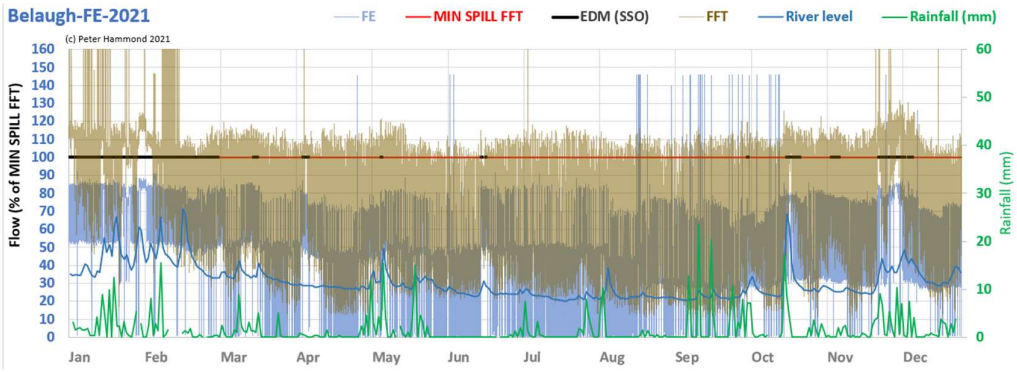


Figure 2: 2021 overview of treatment, spill, rainfall and river level data for Belaugh STW.

The detailed spill start-stop times provided to WASP by AW look to be consistent with the treatment, rainfall and river level data, and also with the summary spill data submitted to the EA by AW.

WASP believes that there were 14 illegal early spilling days (**Fig**. 333333) at Belaugh STW in 2021.

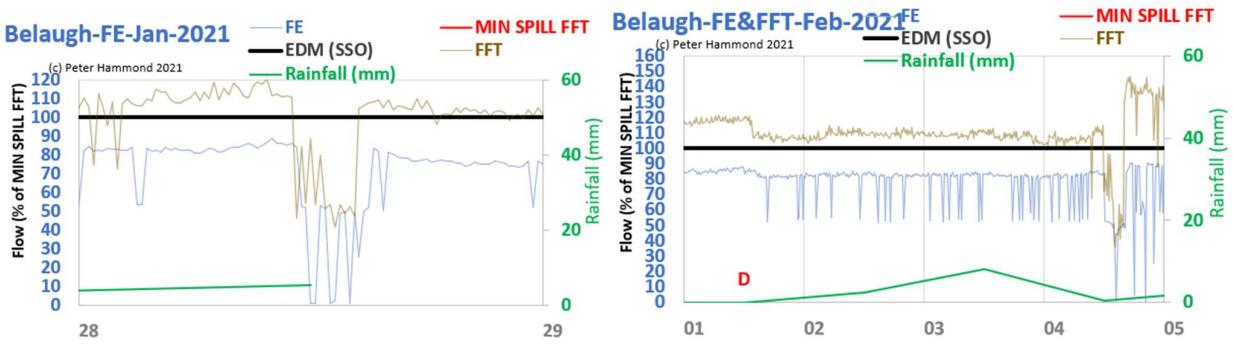


Figure 3: WASP believes there were 2 illegal early spilling days at Belaugh STW in 2021 (Jan 28; Feb 4)

WASP also believes that there were 12 illegal dry spilling days at Belaugh STW in 2021 (**Fig**. 4).

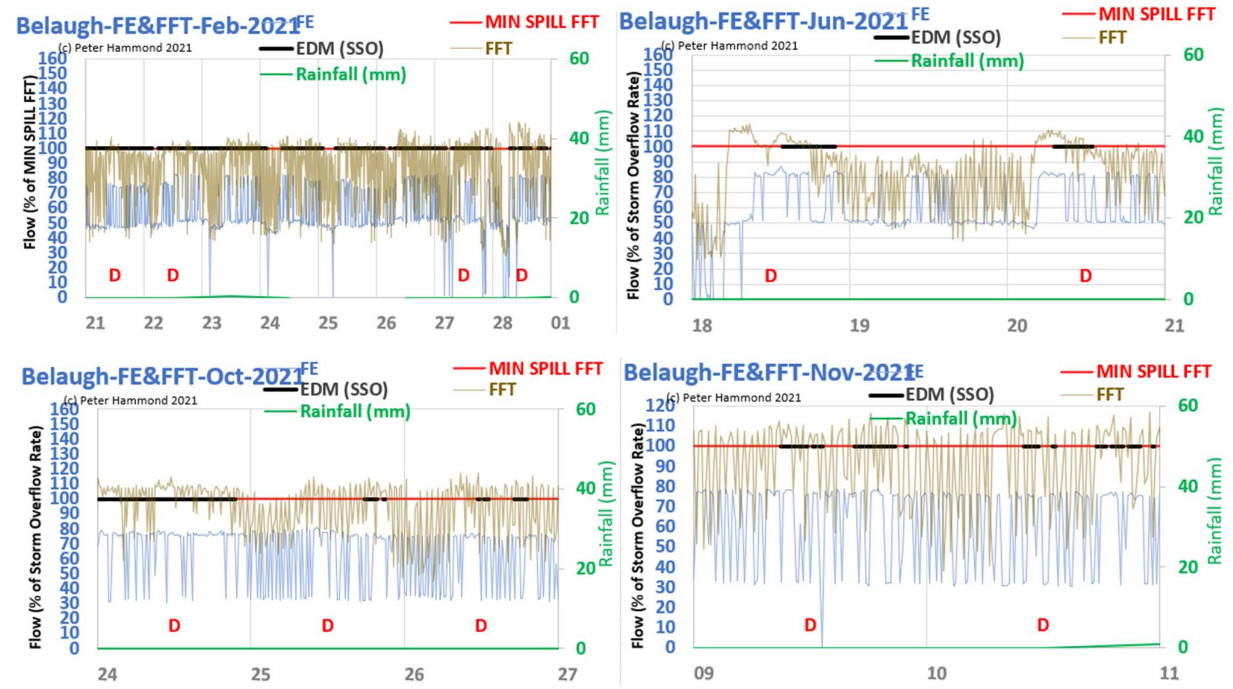


Figure 4: WASP believes there were 12 illegal dry spilling days at Belaugh STW in 2021 (Jan 28; Feb 1,21,22,27,28; Oct 24-26; Nov 9-10)

Burnham Market STW – ANGLIAN WATER (AW)

year	EDM SUBMISSION TO EA hours	spills	active	comments	WASP beliefs/facts
2018	-	-	-		
2019	-	-	-		
2020	414	115	100.00%	Catchment investigation underway	23 illegal spilling days
2021	1,554	105	100.00%	Performance – GW inundation Resolved - April	100 illegal spilling days

Table 1: EDM annual summary spill data submitted to EA by Anglian Water for Burnham Water STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Burnham Market serves a population equivalent of almost 6,000 and discharges into the River Burn, a chalk stream in Norfolk. The EDM spill and flow data for 2021 were requested by EIR by Joe Crowley. WASP obtained the EDM data for 2020 through an additional EIR request.

2021

It is clear from the overview chart (**Fig**. 1) for 2021 that every spill occurs without the works capacity being reached and hence is illegal.

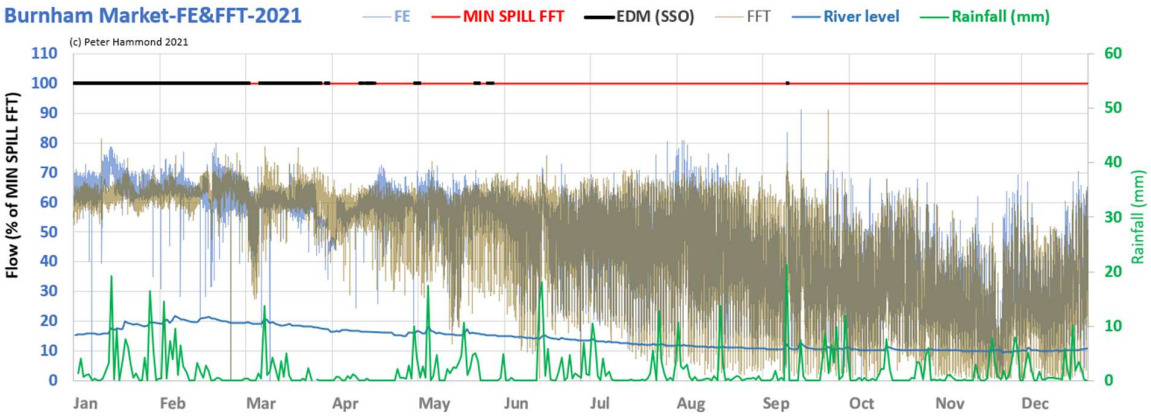


Figure 1: 2021 overview chart for Burnham Market showing that every spill is illegal

WASP believes there were 100 illegal spilling days, some of which were both dry and early i.e., doubly non-compliant.

2020

WASP has no treatment data for 2020 for Burnham Market, but **Fig**.2 shows spill, rainfall and river level data.

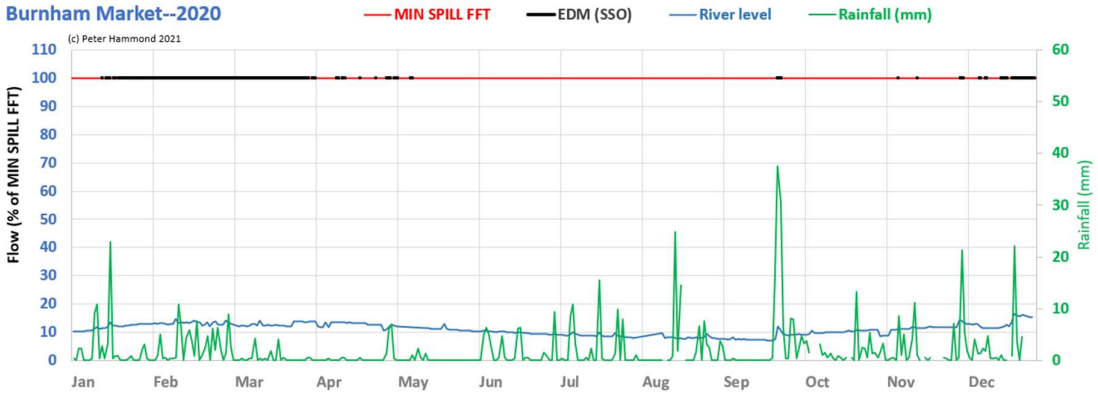


Figure 2: overview chart for Burnham Market for 2020

From analysis of the detailed spill and daily rainfall data, WASP believes there were at least 23 illegal dry spilling days at Burnham Market STW in 2020. Some examples are shown in **Fig**. 3.

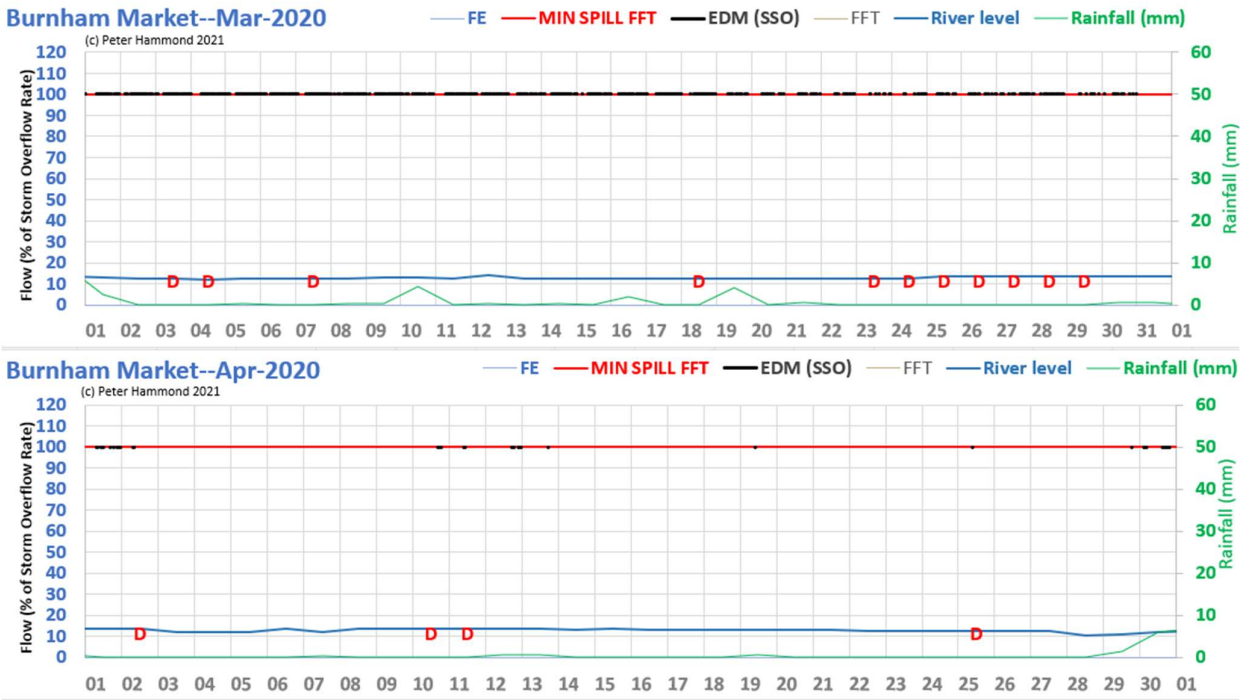


Figure 3: WASP believes there were 23 illegal spilling days at Burnham Market STW in 2020 including 15 on Mar 3,4,7,18,23-29; Apr 2,10,11,25.

Canvey Island STW – ANGLIAN WATER (AW)

EDM SUBMISSION TO EA					
year	hours	spills	active	comments	WASP beliefs/facts
2018				-	
2019	5,244	226	100.0%	Under investigation	less than 500 spilling hours
2020	6,398	331	100.0%	Possible SOAF investigation with EA agreement	less than spilling 900 hours
2021	552	121	100.0%	N/A - Ongoing investigation	more than spilling 800 hours at least 15 illegal spills

Table 1: EDM annual summary spill data submitted to EA by Anglian Water for Canvey Island STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Canvey Island STW serves a population of almost 40,000 and discharges to the Thames Estuary. It has no storm tank but a storm overflow at its inlet. Its EDM device was installed on 1st April 2019 but:

> *"There was a monitor fault from 27 May 2019. We can show, using corroborating evidence, that the site was not discharging to storm throughout that time period. This site is currently under investigation."* Anglian Water

WASP believes that Anglian Water (AW) submitted incorrect EDM spill data to the EA in both 2020 and 2021. In 2020, WASP believes there was a 7-fold exaggeration and in 2021 there was a 300 hour shortfall.

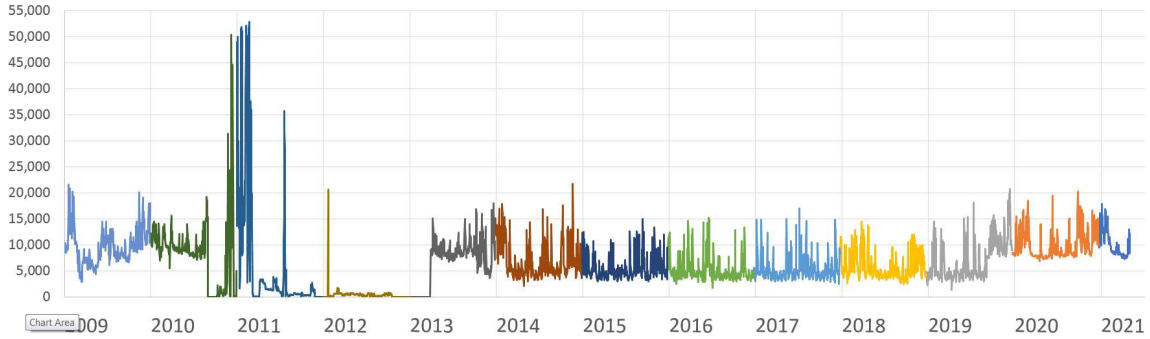


Figure 1: Canvey Island STW Total Daily Volume for 2009 to May 2021

Any investigation of Canvey Island STW should also look into historic treatment data supplied to the EA. The total daily volume (TDV) of sewage treated since 2009, as AW reported to the EA and WASP, is shown in **Fig**. 1. The detailed values can be ignored, it is the anomalous values for 2010-2013 that are of concern. The EA would surely not accept 4 years of such absurd data without further scrutiny. Then, there is the dramatic reduction of TDV in early 2014 followed by a period of stability until autumn 2019 when it appears to double abruptly to 2009-like figures. WASP was also provided with separate sewage treatment data measured every 15 minutes by a certified (MCERTS) meter from which TDV would typically be derived. **Fig**. 2 shows inconsistency for the total annual treated volume, derived separately from the **TDV** and from the **MCERTS 15-min flow**.

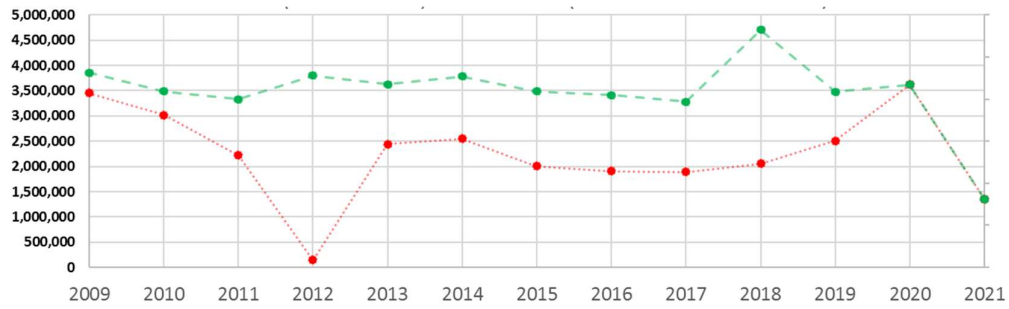


Fig 2: Canvey Island STW Total Annual Volume (TAV) flow for 2009 to May 2021 derived from TDV and MCERTS data

In response to WASP's EIR request, AW said:

> *Please note, in June 2016 the location of the flow monitor was changed from the back end to the inlet and a different device was installed.* Anglian Water

So, from June 2016, WASP has assumed that AW has provided records of sewage flow receiving full treatment.

2019

In 2019, the summary spilling data that Anglian Water reported to the EA for Canvey Island STW was 5,243.25 hours and that it was "Under investigation". The detailed EDM data provided to WASP also corresponds to 5,244 hours but looks totally inconsistent with the detailed treatment flow data also provided by AW. The usual spill induced flattening of sewage treatment data is only occasionally evident. For example, the EDM data suggests unbroken spilling in July but WASP believes the only spills were on July 20th and 27th (**Fig**. 3).

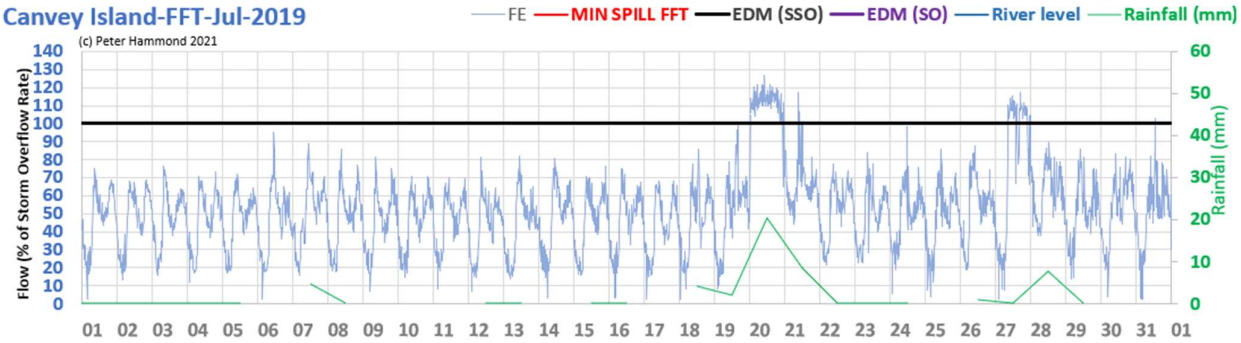


Figure 3: AW said Canvey spilled for all of July'19 (black horizontal). WASP believes it spilled only on 20th and 27th

For 2019, WASP estimates actual spilling hours to be hundreds, not thousands. The annual 2019 chart for Canvey Island STW demonstrates this quite clearly (**Fig**. 4).

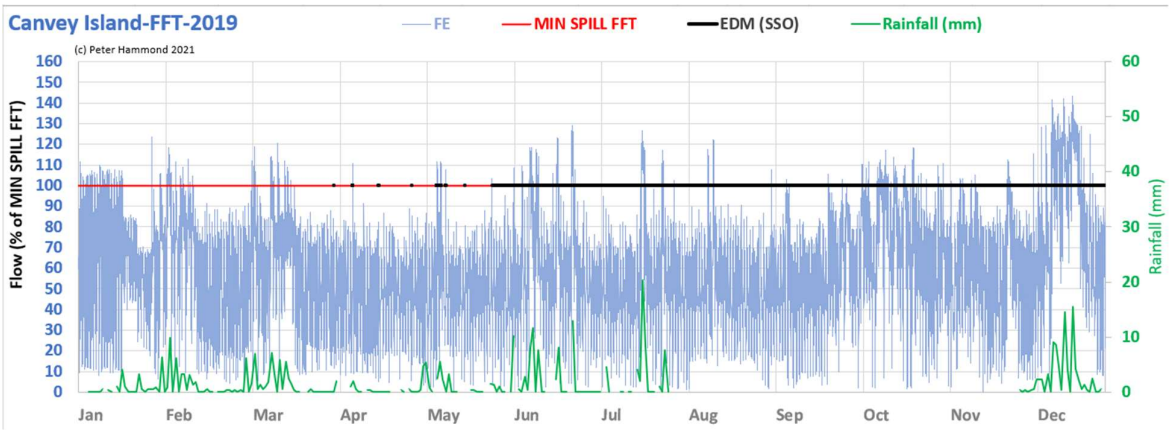


Figure 4: annual overview for 2019 EDM and sewage treatment data for Canvey Island STW

2020

In its 2020 EDM submission to the EA, AW reported 6,398 spilling hours along with a comment saying the overflow might be subject to investigation. In fact, the detailed spill data provided to WASP suggests about 900 spilling hours. Once again, the typical flattening effect of spills on sewage treatment data hardly occurs. The annual overview chart in **Fig**. 5 demonstrates inconsistency between the detailed spill and sewage treatment flow data.

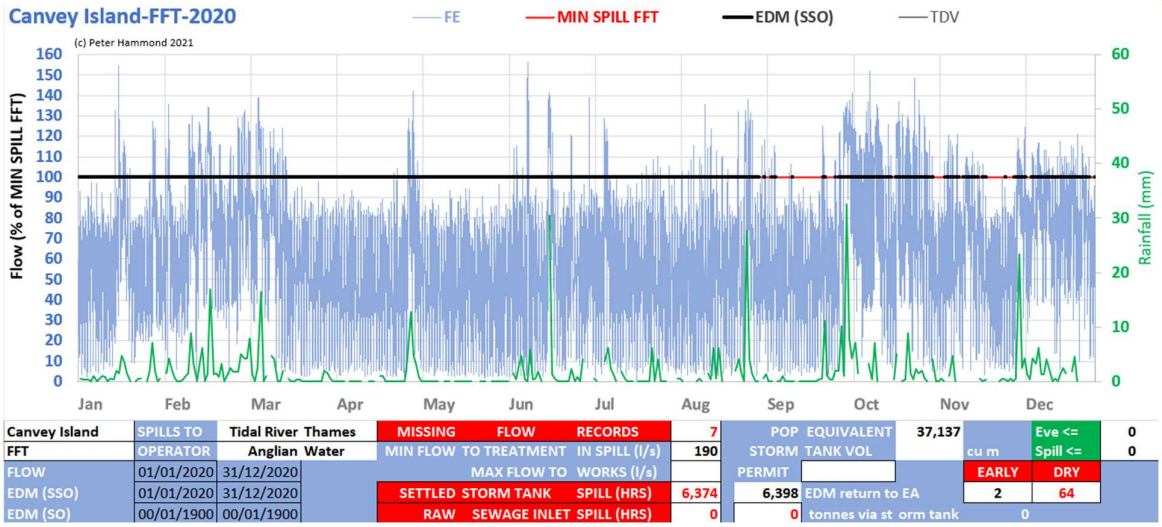


Figure 5: annual overview chart for detailed EDM and flow provided by AW for Canvey Island STW for 2020

The detailed spill data provided to WASP suggests (erroneously) that there was a single continuous spill from Jan-Aug. Because of the unreliability, WASP cannot easily check compliance with permit conditions.

WASP believes the detailed spill data for October to November 2020 are actually consistent with the treatment flow data and daily rainfall (**Fig**. 6) and generally are compliant with permit conditions.

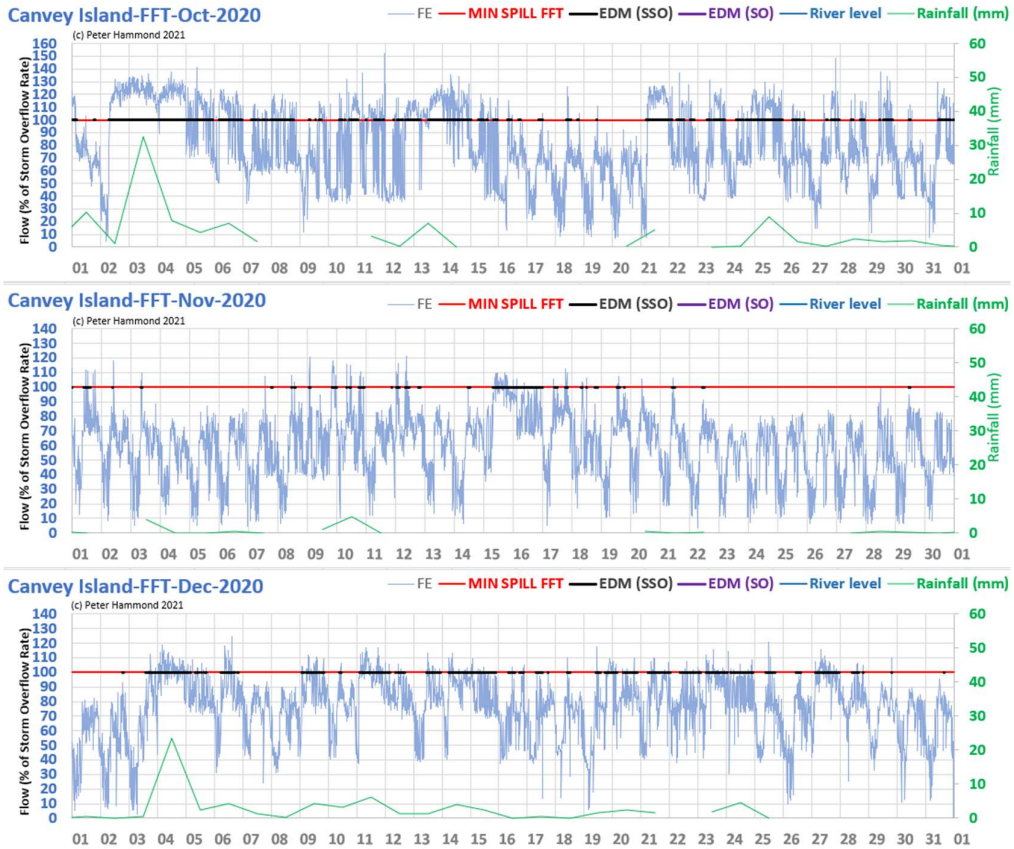


Figure 6: detailed EDM and treatment flow data provided by AW for Canvey Island STW for 2021

2021

In 2021, the EDM spill detection at Canvey Island STW looks more consistent with sewage treatment and rainfall data, but suggest non-compliance such as 11 illegal spilling days in January and February 2021 (**Fig**. 7).

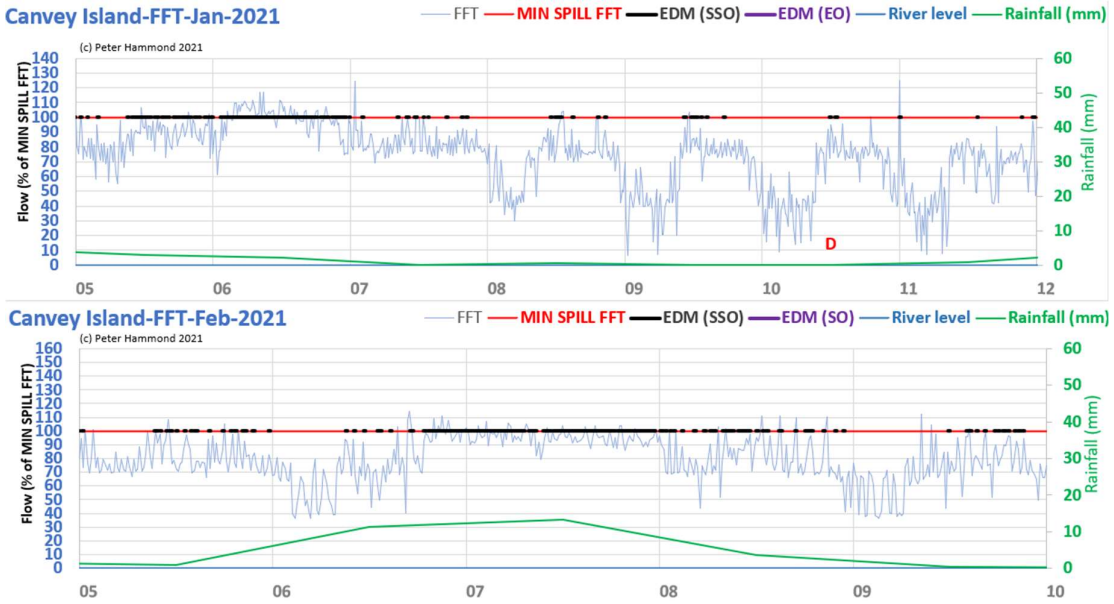


Figure 7: the EDM (SSO) detected spills in Jan and Feb 2021 look consistent with treatment (FFT) and rainfall data but frequently breach permit conditions (Jan 5,7-12; Feb 5,6,8,9)

Later in 2021, the EDM monitoring device appears to have missed many spills. For example, WASP believes spills occurred in October and December that were not detected/reported to the EA by AW (**Fig**. 8)

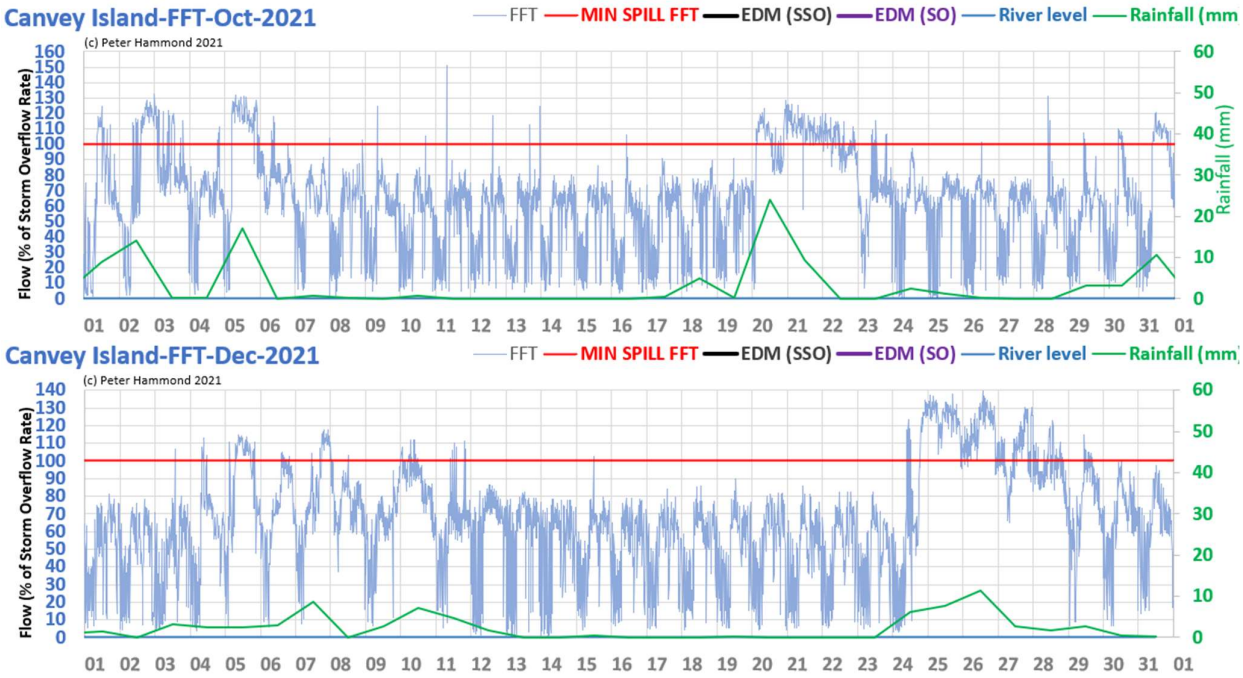


Figure 8: sewage treatment flow and rainfall data that WASP believes suggest unreported spills on October 2,5,20-22,31; December 5,7,10,25-28

Clacton STW – ANGLIAN WATER (AW)

EDM SUBMISSION TO EA					
year	hours	spills	active	comments	WASP beliefs/facts
2018					
2019					
2020					
2021	729.03	112	99.87%	Data collection - Confirmed exceptional weather – Remaining spills not above SOAF threshold	22 illegal spilling days

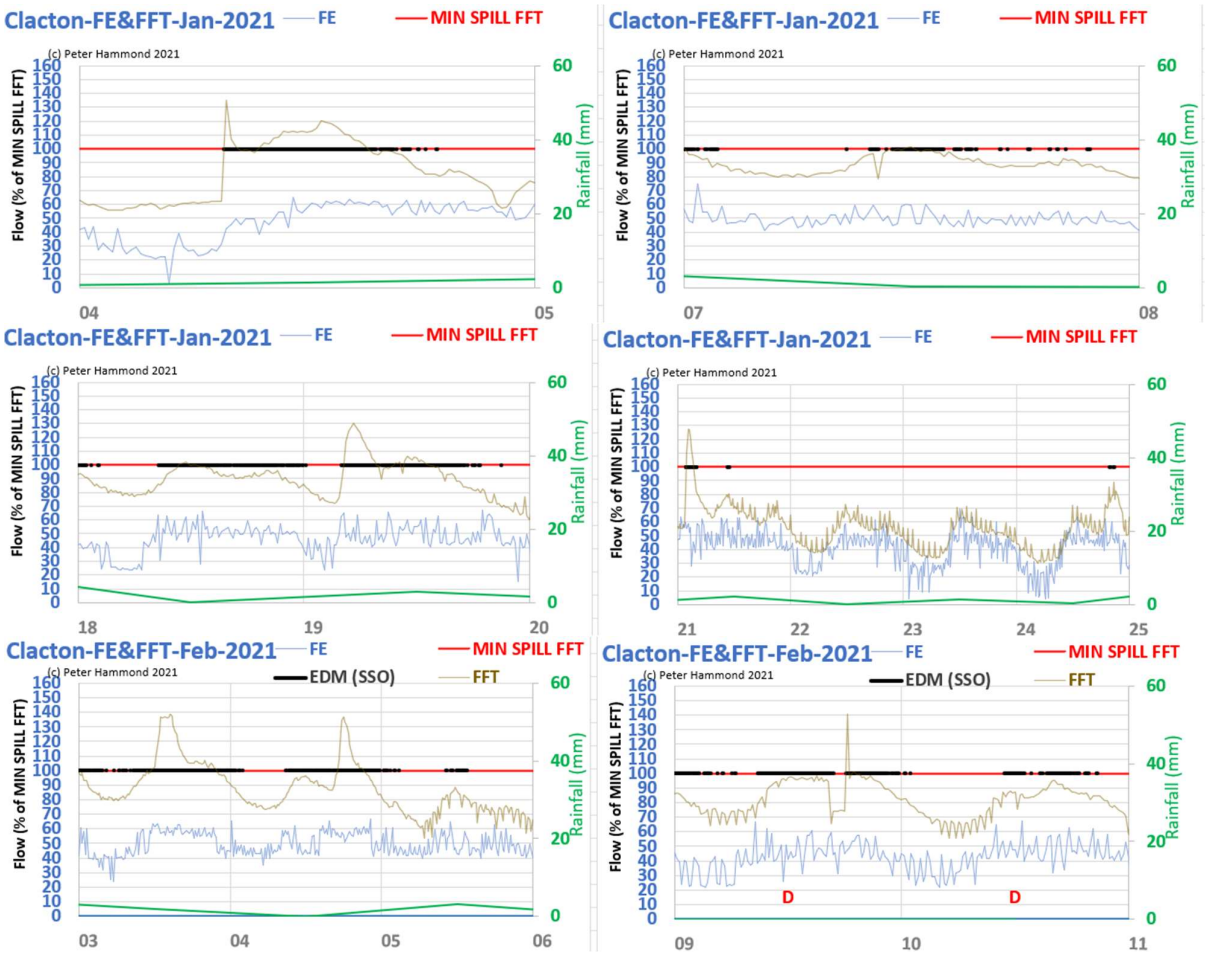
Table 1: EDM annual summary spill data submitted to EA by Anglian Water for Clacton STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Clacton STW discharges to the North Sea, serving a population equivalent of more than 54,000. Clacton beach has often been contaminated with sewage bacteria and was ranked among the seven worst in England for water quality for over seven years[10].

2021

WASP believes there were 22 days involving illegal "early" discharges of untreated sewage from Clacton STW.



[10] https://www.eadt.co.uk/news/clacton-beach-fails-water-quality-tests-for-seventh-year-running-2396636

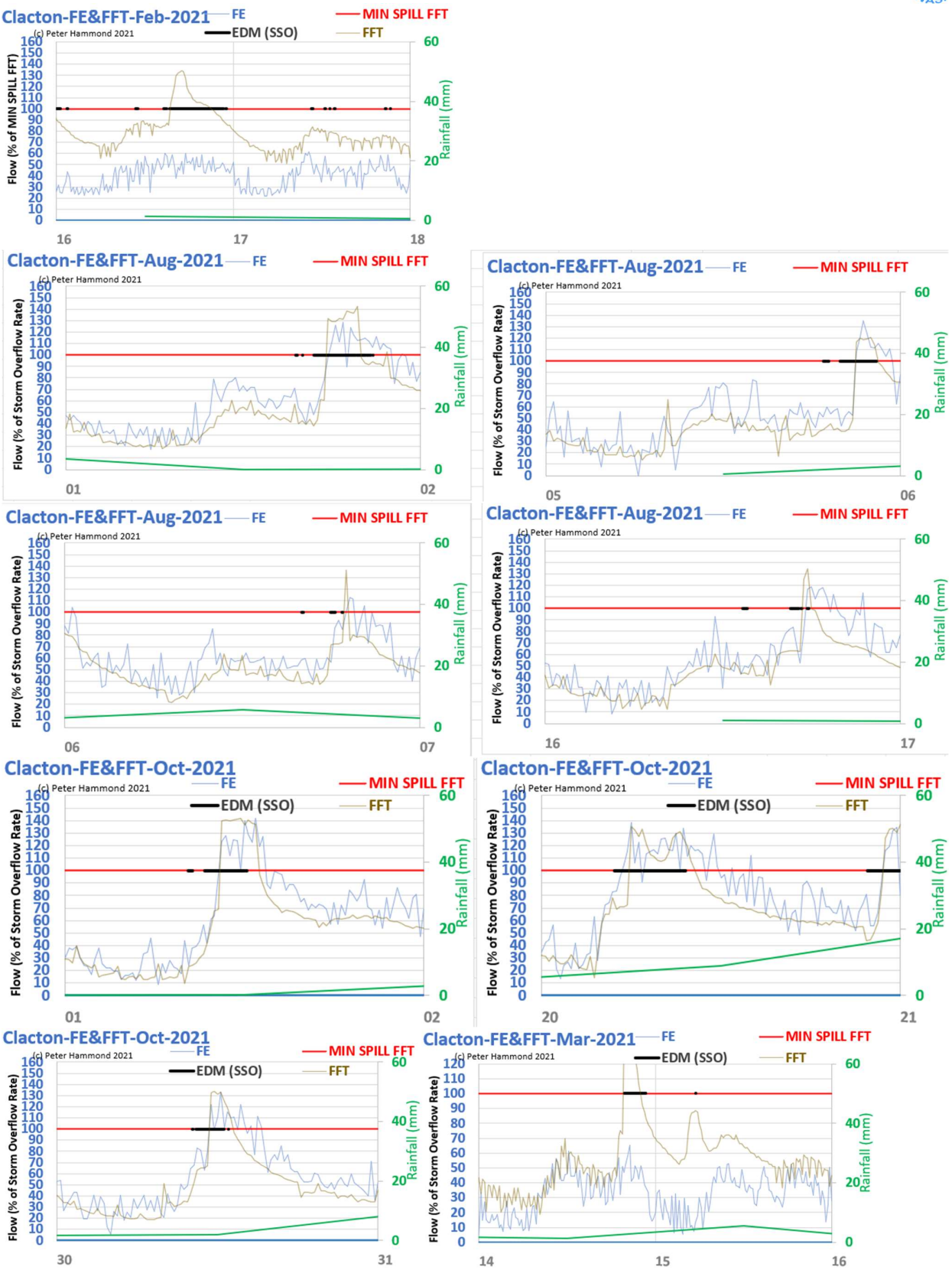


Figure 1: WASP believes there were 9 days with illegal "early" spills at Clacton STW in 2021 (Jan 4,7,18,19,21,24; Feb 3,4,5,9,10,16,17; Mar 14,15; Aug 1,5,6,16; Oct 1,20,30)

2022

In an article[11] about sewage pollution by Anglian Water and its decline from a 3* rating to 2*, a spokesperson for the WaSC said in July 2022

> *"Already in the first six months of this year we've seen a reduction in pollution incidents, and an improvement in our operational performance."* **Anglian Water**

In the case of Clacton STW, that claim does appear to be supported by the first 3 months spilling data for 2022 (**Fig**. 2).

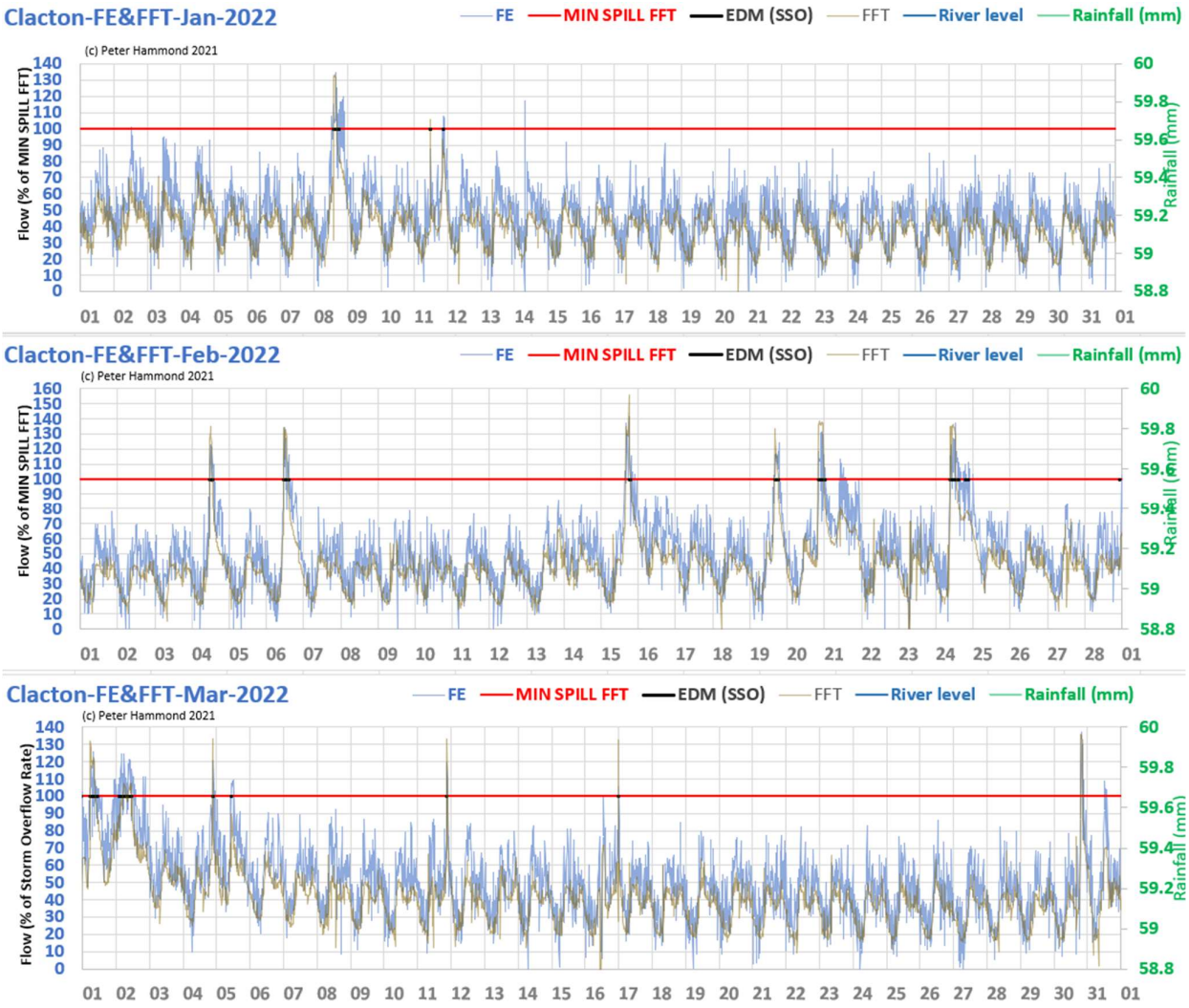


Figure 2: WASP believes that in Jan-Mar 2022 spilling at Clacton STW has been compliant with discharge permits

[11] https://www.clactonandfrintongazette.co.uk/news/20282653.anglian-water-companies-decline-pollution-report/

Ely New STW – ANGLIAN WATER (AW)

EDM SUBMISSION TO EA					
year	hours	spills	active	comments	WASP beliefs/facts
2018	5,061	196	88%		8 days with illegal spills
2019	8,760	366	100%	Reporting logic resolved. Under further investigation	
2020	3,948	168	66%	Changed to alternative monitor type, now resolved	AW admitted additional unreported spills 4/11 unreported spilling days were illegal estimated further 140 spill hours
2021	0	0	100%		AW admitted unreported spills 4/19 unreported spilling days were illegal estimated more than 200 spill hours

Table 1: EDM annual summary spill data submitted to EA by Anglian Water for Ely New STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Ely New STW spills to the Great Ouse treating sewage for a population equivalent of about 9,000.

On 13/12/2021, WASP asked AW for sewage treatment and EDM spill data via an EIR request that was fulfilled on 07/01/2022. WASP believes the spill data that AW submitted to the EA for 2018 and 2019 to be unreliable and that for 2020 and 2021 to be incorrect. It took repeated pressure from WASP to force Anglian Water to admit that there were spills from mid-2020 to end of 2021 when the company had initially denied there were any. WASP identified even more spills at Ely New STW than admitted and some of these WASP believes to be non-compliant and hence illegal.

2018

The 5,061 spilling hours for 2018 are unreliable. In May 2018 the detailed EDM and treatment data are inconsistent (**Fig**. 1) As WASP has pointed out previously, spills result in flattening of the curve representing detailed sewage treatment. There is little evidence of this in **Fig**. 1 during the purple horizontal segments when AW says spills were detected, except for an illegal early spill on 13th and spills on 24th and 25th.

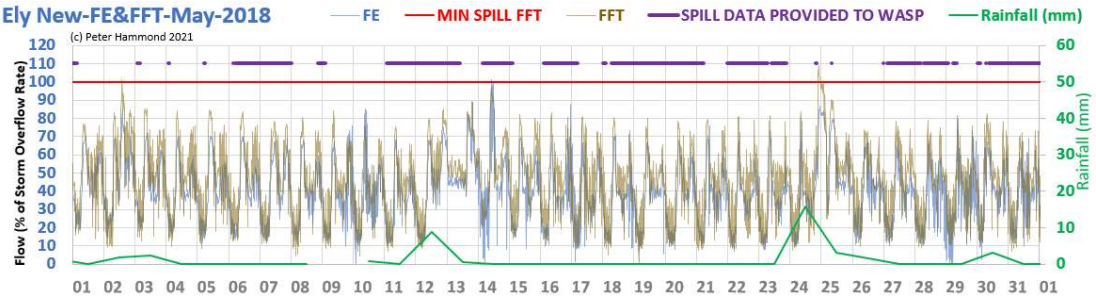


Figure 1: detailed sewage treatment flow and detailed EDM spill data in May 2018 for Ely New STW the usual flattening of treatment flow during spills occurs rarely

*(**FFT**=sewage flow passed to full treatment; **FE**=final effluent flow after full treatment; **MIN SPILL FFT**=minimum sewage treatment during spills)*

So WASP believes almost all of the spills indicated by AW's EDM data in Fig. 1 are false positives. On the other hand, WASP believes there were many undetected spills, or false negatives, in 2018. WASP believes that some were also illegal (Jan 2-4, 27-28 and Feb 9-10; **Fig**. 2) when during spills the sustained treatment was less than minimum specified in the EA discharge permit.

2019

The 2019 figure of spilling 8,760 hours in Table 1 would mean spilling 24 hours every day for a year, so the EDM spill records submitted by AW to the EA are undoubtedly incorrect. The EDM device was clearly faulty

for the entire year and AW either ignored this or did not check its performance. AW confirmed that the spill monitor was replaced in June 2020 after which it claimed there were no spills.

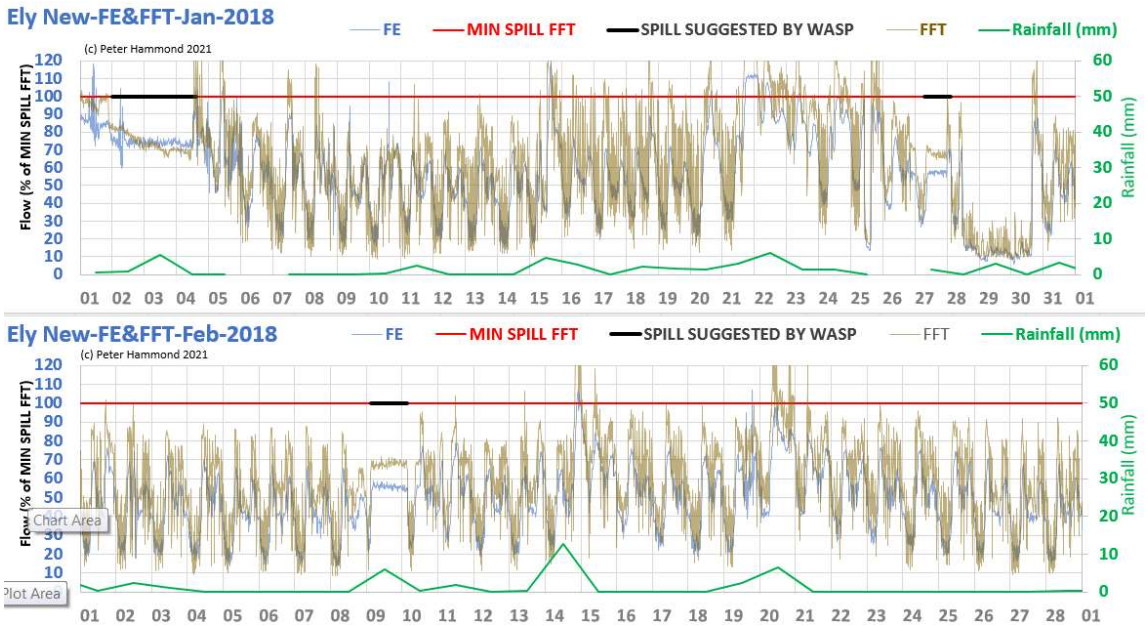


Figure 2: detailed sewage treatment flow and detailed EDM spill data for Jan and Feb 2018 for Ely New STW

In 2022, WASP and Anglian Water exchanged a series of emails in which AW gradually admitted there were spills in late 2020 despite previously reporting to the EA that there were none after the EDM device was changed in June (**Fig. 3**). After WASP requested telemetry data recording alarm notifications from the works to its control centre, Anglian Water admitted that although they returned 0 spills/0 hours to the EA for 2021 there were spills in 2021 on 10 days. The language used in the email exchange gradually changes from spills to "detected spills". AW also went out of their way to point out that these admitted spills were not illegal. WASP agrees but also believes there were unreported spills on a further 11 days, in 2021, of which at least 3 were early (i.e. occurred when the sewage sent to treatment was below works capacity) and hence illegal.

AW->WASP	*"The EDM monitor was found to be unreliable and was changed in June 2020.* ***There have been no further alarms since the monitor was changed****."*
WASP ->AW	*"Unfortunately, the file I was sent has only the EDM data as below – April to July 2018."*
AW->WASP	*"The stop date for the final entry is 15/06/2020. I have highlighted the data in yellow below. As indicated, the EDM monitor was not operating correctly. Once the monitor was replaced* ***there were no further alarms"***
WASP ->AW	*Does this mean that the two returns to the EA below for 2019 and 2020 are incorrect and that there were no spills in either year? Or have you scrapped all data for these two years as being incorrect? If there are EDM data available for 2021 I would be grateful if you could provide them*
AW->WASP	*I enclose an events report between Ely New WRC and our OMC for 1 to 10 October 2020.* ***There was an intermittent discharge from the storm tanks between approximately 4.30 pm on 3 October 2020 and 1 am on 4 October 2020****. This was caused by a partial blockage under the inlet penstock.*
WASP ->AW	*So there were spills from the storm tank in October 2020. This does not seem to be consistent with a previous email when you said "Once the monitor was replaced there were no further alarms".*
AW->WASP	*As indicated previously, there were no recorded EDM alarms in 2021. As a result, there were no 2021 EDM detected individual spill start-stop times for Ely New STW. We have cross referenced various datasets and* ***believe there were spills*** *on the following dates: 14-15 January 2021, 16-17 January 2021, 29-30 January 2021, 6-8 February 2021, 21 October 2021. These were all during storm events when our data shows we were meeting full flow to treatment at the works*

Figure 3: email exchange in which Anglian Water (AW) admitted to incorrect EDM data given to EA for 2020 & 2021

2020

WASP agrees with AW that there was a small spill on June 15th (**Fig.** 4). But was there a spill on June 16th, an illegal "early" spill on the morning of June 17th, and a further spill on the afternoon and evening June 18th? The flattening of sewage treatment flow data suggests spills in June 2020 additional to those admitted by AW.

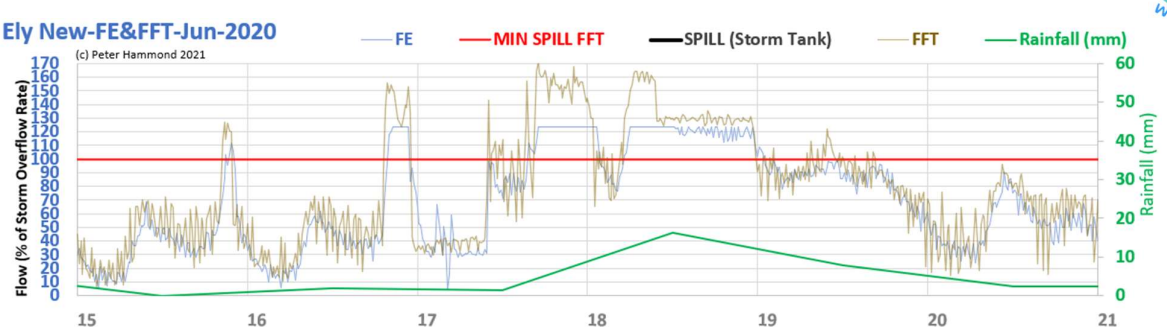


Figure 4: sewage treatment flow and EDM spill data for 15th-20th June 2020

The spills finally admitted by AW for Oct 3rd-4th 2020 look to be actually on Oct 1st, 2nd, 3rd and 4th 2020 – and WASP believes all were "early" and hence illegal (**Fig**. 5).

Figure 5: sewage treatment flow and EDM spill data for 29thOct - 5th Nov 2020

There also appear to be unreported (but permissable) spills on Dec 4th-5th and Dec 24th-25th 2020 (**Fig**. 6).

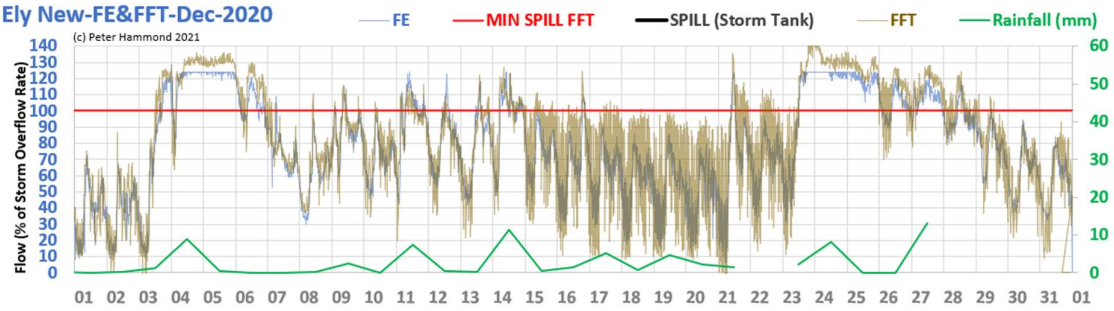
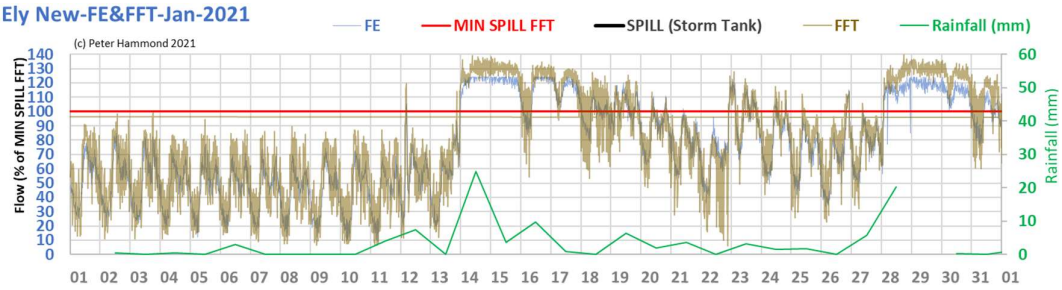


Figure 6: sewage treatment flow and EDM spill data for December 2020

2021

WASP agrees with the spills finally admitted by AW for January, February and October 2021 – see **Fig**. 7 below - but suggests that they may have started earlier than admitted. That depends on the storm tank size and how long the diversion of excess sewage flow could be held back from spilling into the watercourse.



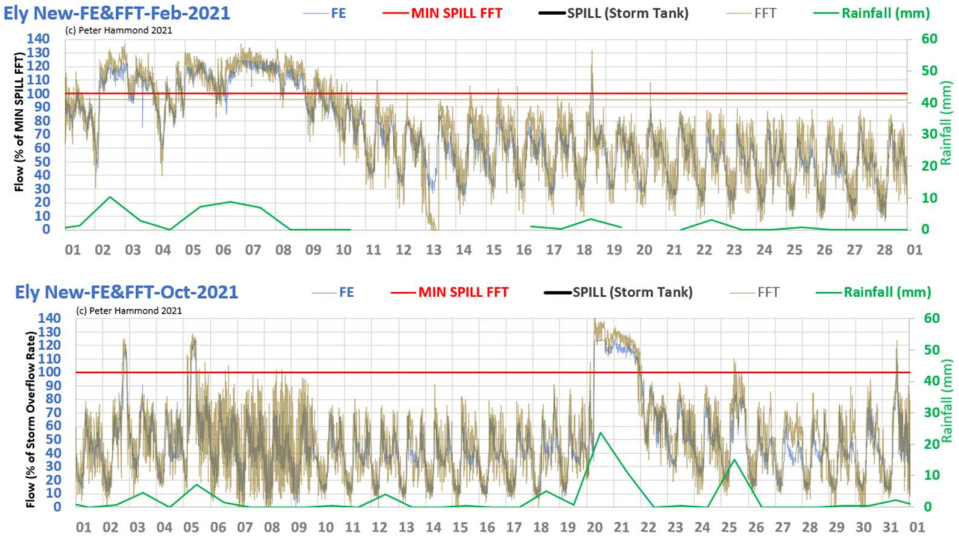


Figure 7: WASP agrees with AW about admitted but unreported spills detectable in the detailed sewage treatment flow and EDM spill data for Jan, Feb and Oct 2021

But what about the following possible spills on May 8; Jun 18, 20, 21; Sep 14-15; Dec 10, 26-29 in **Fig**. 8.

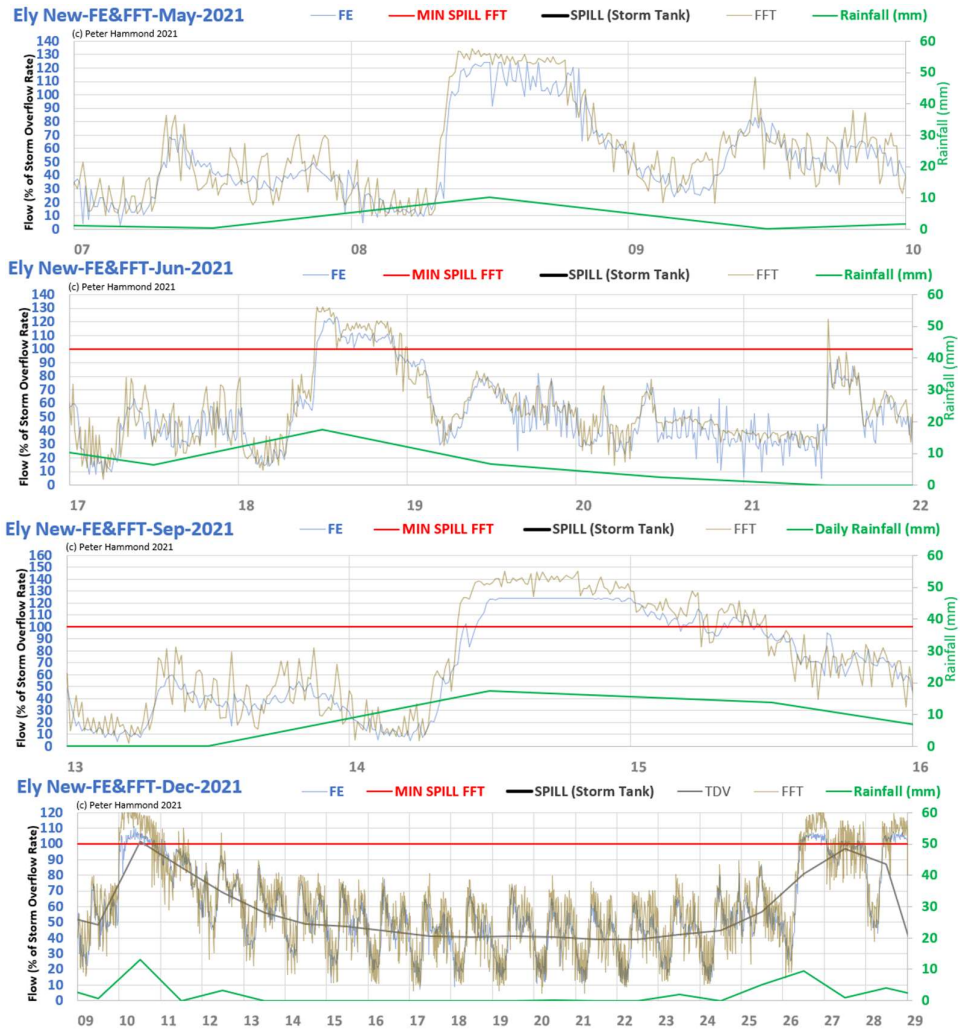


Figure 8: sewage treatment flow and EDM spill data for Ely New STW showing possible spills on May 8; Jun 18, 20, 21; Sep 14-15; Dec 10, 26-29

Fakenham STW – ANGLIAN WATER (AW)

EDM SUBMISSION TO EA					
year	hours	spills	active	comments	WASP beliefs/facts
2018					
2019	50	13	99.98%		at least 90 spilling hours 4 illegal spilling days
2020	507	39	100.00%		5 illegal spilling days
2021	1,642	79	100.00%		15 illegal spilling days

Table 1: EDM annual summary spill data submitted to EA by Anglian Water for Fakenham STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Fakenham STW serves a population of 17,871 and discharges to the River Wensum, the largest chalk stream in Norfolk and designated a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC).

2021

The 2021 overview chart (**Fig**. 1) shows reasonable consistency between rainfall data and both flow to full treatment(FFT) and final treated effluent data FE).

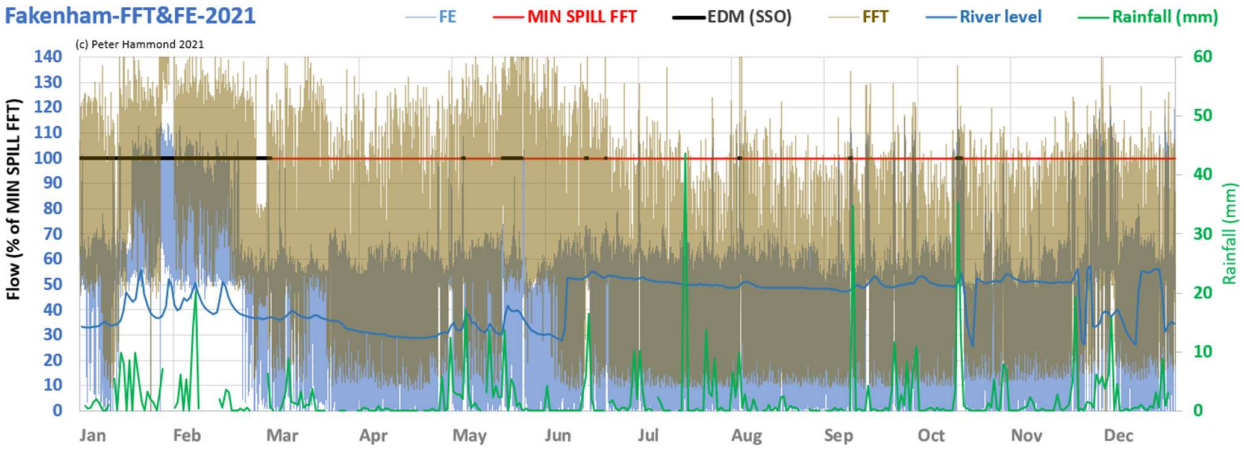


Figure 1: 2021 overview chart for Fakenham STW

WASP believes there were at least 12 early and 3 dry illegal spilling days in 2021. Examples are shown below in **Figs**. 2 and 3.

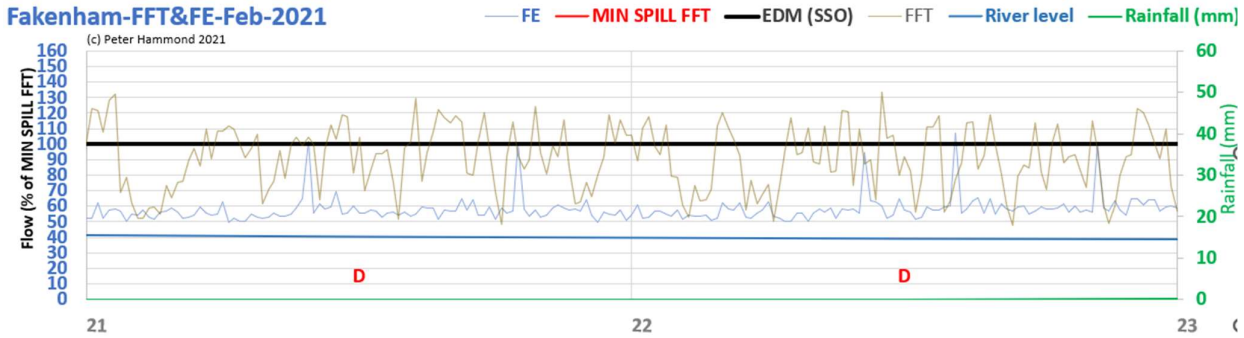


Figure 2: examples of dry illegal spills to the River Wensum from Fakenham STW in 2021

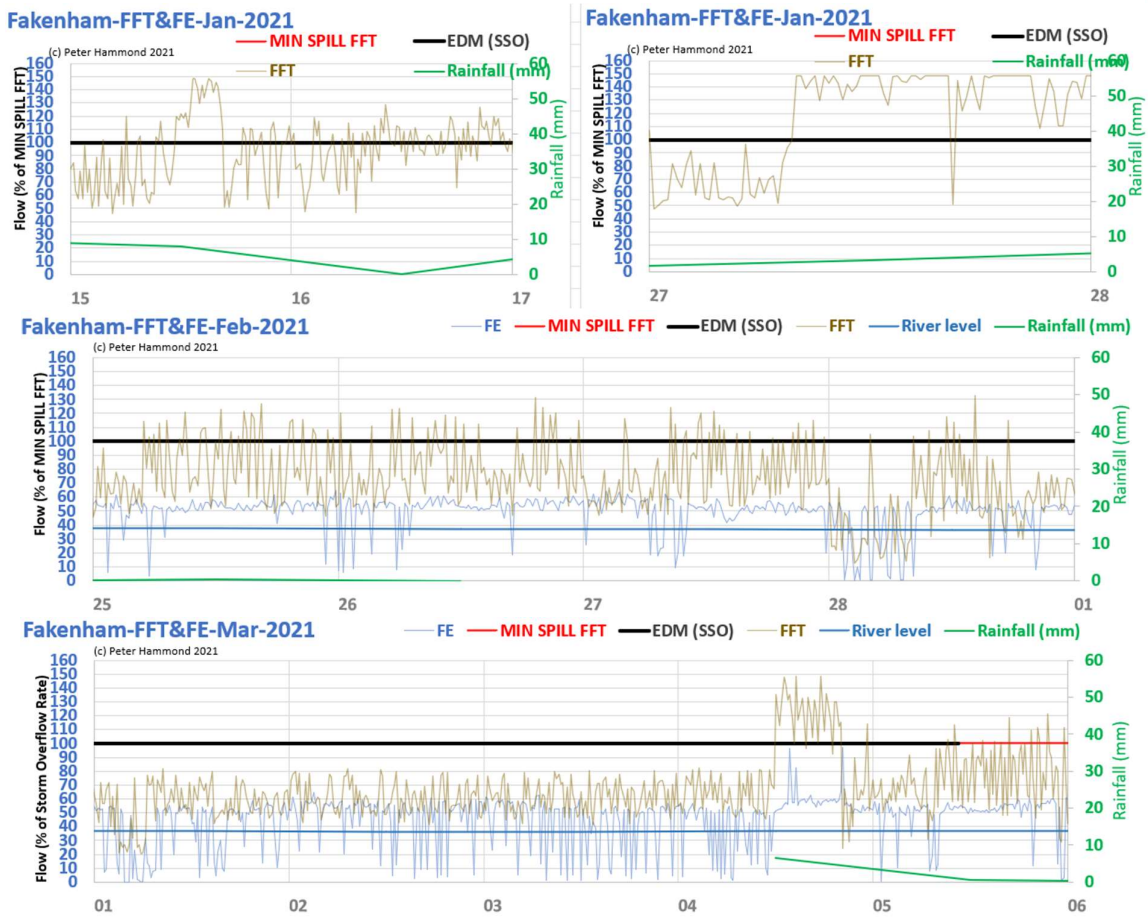


Figure 3: examples of early illegal spills to the River Wensum from Fakenham STW in 2021 (Jan 15,16,27; Feb 25-18; Mar 1-5)

2020

AW provided individual spill data that concurred with the EDM summary data submitted to the EA of 507 spilling hours over 40 spilling days of which WASP believes 2 involved a "dry" spill and 3 "early" spills (**Figs**. 4 and 5).

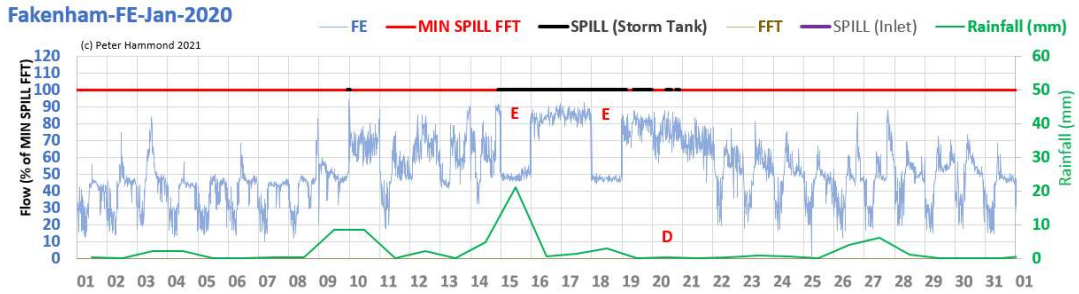


Figure 4 One "dry" (Jan 20th) and two "early" spills (Jan 15th and 18th) at Fakenham STW in 2020

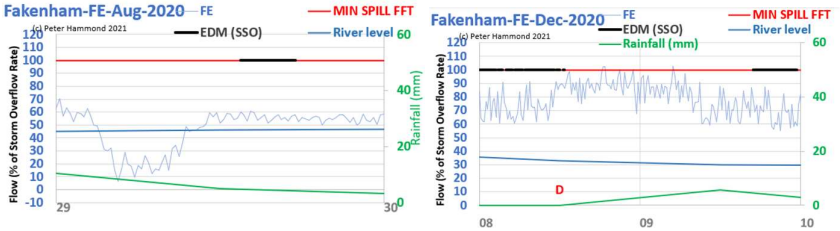


Figure 5 An "early" spill on August 29th and dry spill on Dec 8th at Fakenham STW in 2020

2019

The spill data provided by Anglian Water for 2019 is not uniformly consistent with rainfall and sewage treatment data and is therefore considered unreliable by WASP. To begin with, AW provided individual spill data suggesting there were at least 260 spilling hours whereas AW's submission to the EA was for about 50 hours. In December 2019 alone, WASP believes there were at least 90 spilling hours (**Fig**. 6).

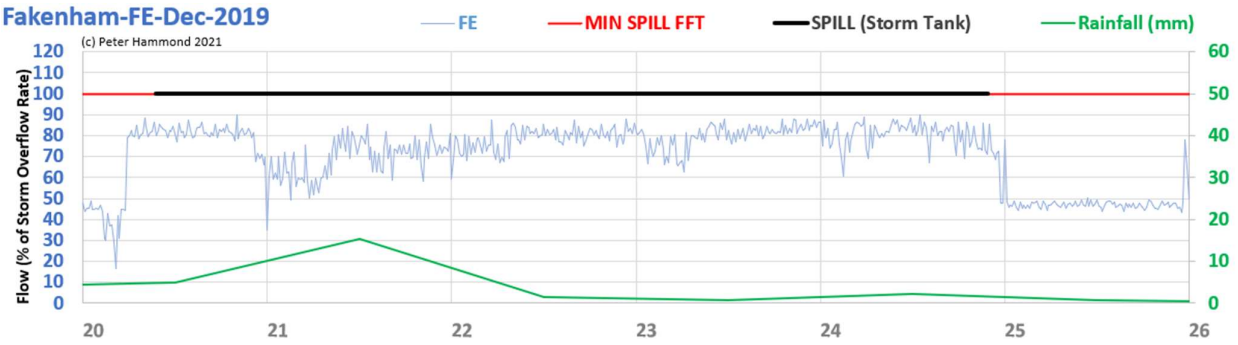


Figure 6: WASP believes there were over 90 spilling hours (Dec 20th-26th) and 2 illegal spilling days (Dec 21st and 25th)

In contrast, WASP also believes some of the individual spill data includes false positives (**Fig**. 7).

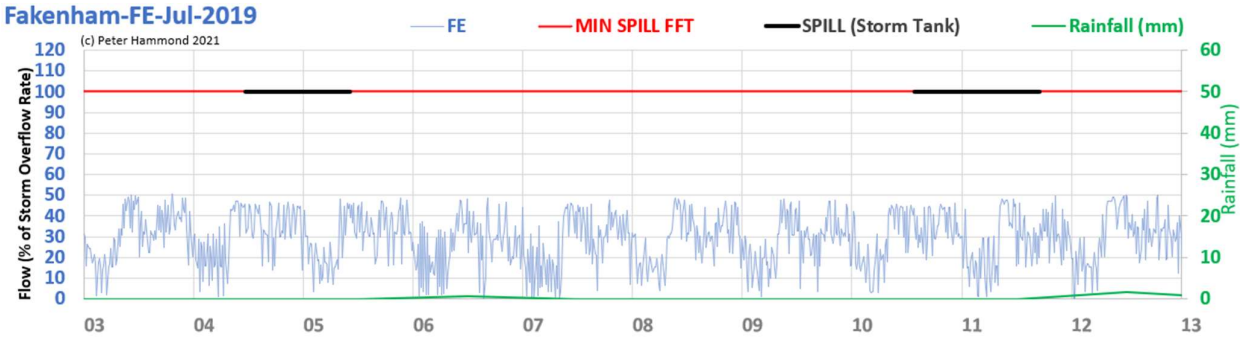


Figure 7: WASP believes there are false positive spills (e.g. July 4th-5th and July 10th-11th) in data provided by AW

WASP believes the individual spill start-stop times, the sewage treatment flow data and rainfall are consistent with 4 illegal spilling days (**Figs**. 6 and 8).

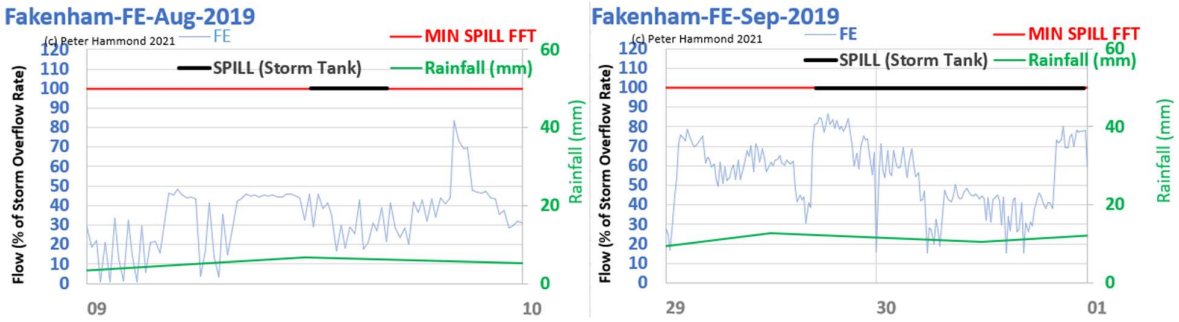


Figure 8: WASP believes were illegal "early" spills on Aug 9th and Sept 30th

Odell STW – ANGLIAN WATER (AW)

EDM SUBMISSION TO EA					
year	hours	spills	active	comments	WASP beliefs/facts
2018					
2019					
2020					
2021					at least 8 illegal spilling days

Table 1: EDM annual summary spill data submitted to EA by Anglian Water for Odell STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Odell STW serves a population equivalent of about 3,600 and discharges to the Great Ouse.

2021

The 2021 overview (**Fig**. 1) shows many anomalies in the sewage treatment data for the first 2 months.

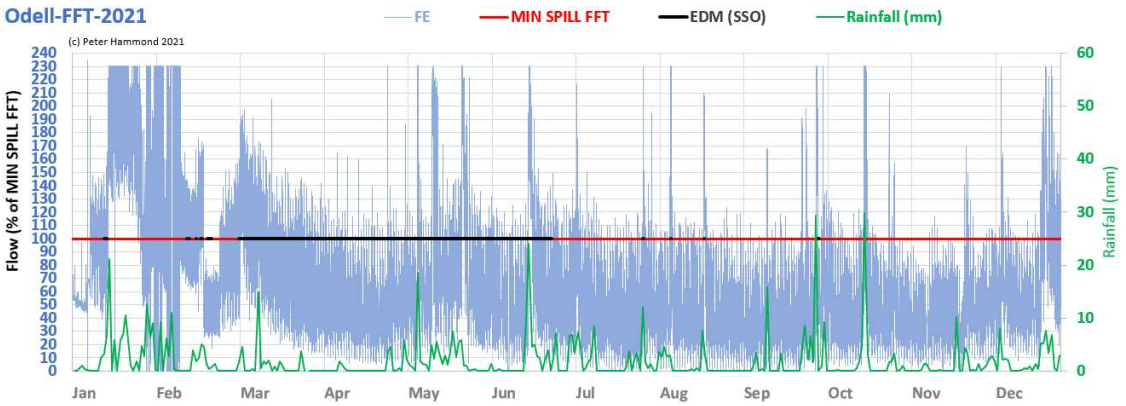


Figure 1: 2021 overview chart of final effluent (FE), rainfall and spill data for Odell STW

A closer look at those 2 months confirms this (**Fig**. 2). WASP believes the 4-month spill between March and June looks inconsistent with the rainfall and sewage treatment data. Moreover, judging by the cutoff at 230% of the design capacity or storm overflow rate of 23.1 l/s, there appears to be a frequently achievable upper limit on the final effluent (FE) meter.

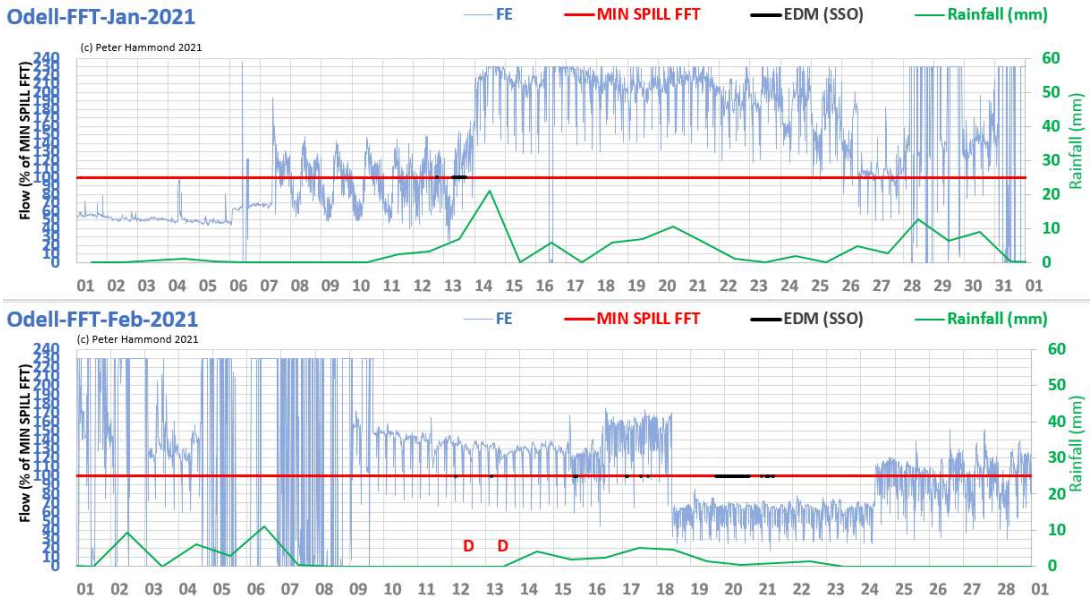


Figure 2: Jan and Feb monthly charts for Odell STW showing strange anomalies in final treated effluent (FE)

WASP believes the detailed spill data provided by AW are often inconsistent with the treatment and rainfall data **Fig.** 3)

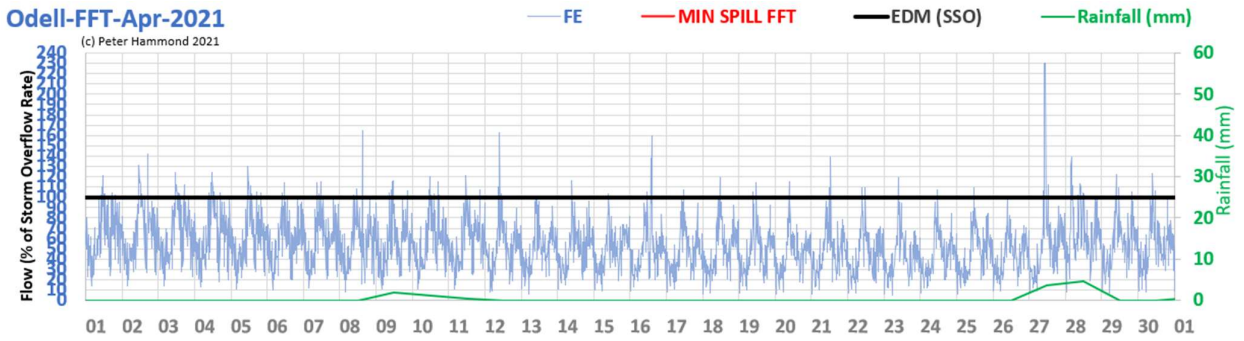


Figure 3: inconsistency between spill, treatment and rainfall data is clear in April 2021

WASP believes there were at least 8 illegal early spilling days at Odell STW in 2021 (**Fig**. 4).

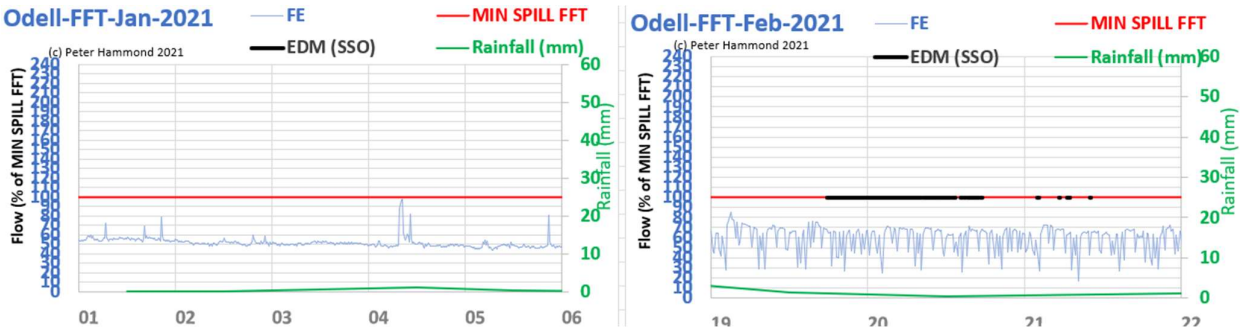


Figure 4: WASP believes there were at least 8 early spilling days at Odell STW in 2021 (Jan 1-5; Feb 19-21)

NORTHUMBRIAN (NW)

Transparency and openness

In response to an EIR request in 2020, Northumbrian Water refused to supply a list of its STWs that were fitted with a flow to full treatment meter on the grounds that EA permits didn't require them to be fitted and

> "*a public authority may refuse to disclose information to the extent that… it does not hold that information when an applicant's request is received."* **Northumbrian Water**

Eight other WaSCs did provide the data. Without knowing which STWs have a flow to treatment meter, it has not been possible for WASP to target specific STWs and check them for early, unpermitted spills. Therefore, WASP's analysis of Northumbrian STWs has always been much more limited than that of other WaSCs.

When interviewed by the Environmental Audit Committee in early 2021, the CEO of NW, Heidi Mottram, did not comment on providing the public with access to sewage treatment and spill data but she did say this:

> ***"…** We already share all our data with the Environment Agency fully and transparently. That is already the case for ourselves, and I am certain it will be for the other companies as well. We have not been asked to share information directly with Ofwat, but there is no problem with that at all if they require that as part of their processes as well.*" **Heidi Mottram, CEO Northumbrian Water**

During the making of the BBC Panorama programme "The River Pollution Scandal", presenter Joe Crowley submitted an EIR request on 29th July 2020 for flow and EDM data in relation to several STWs operated by NW. Such a request should be fulfilled within 20 working days, but NW did not reply until 24th September 2020, some two months later. In the response, NW said that the estimated time to provide the data was 55 hours and that the Information Commissioner's Office recommend a limit of 18 hours' worth of work, after which a request was "manifestly unreasonable", so after consideration they rejected the data request. The BBC Panorama team responded immediately with a request for further discussion. On October 2nd 2020, NW had an impressively rapid change of heart and replied to say that its experts had looked again at the data:

> *"Further investigation revealed that it would be possible to retrieve the data originally requested in another way, which was much quicker than initially expected. It took approximately 3 hours to retrieve the data. Ordinarily, we would request a fee for the provision of this information, however, in recognition of the inconvenience that our initial advice and this delay has caused you we are happy to waive the fee on this occasion.*" **Northumbrian Water**

Earlier in 2021, WASP requested and Northumbrian Water has provided all individual spill start-stop times for its storm overflows.

Northumbrian Water does sometimes change its mind and provide data after an internal review, as is documented below for Allendale STW.

Unlike Severn Trent Water and United Utilities, Northumbrian Water has become more open and transparent in terms of providing data in response to EIR requests from WASP.

Allendale STW– NORTHUMBRIAN WATER (NW)

EDM SUBMISSION TO EA					WASP beliefs/facts
year	hours	spills	active	comments	
2018					at least 2,500 spilling hours
2019					at least 2,000 spilling hours
2020	3,378	176	99.99%		at least 15 illegal dry spilling days
2021	2,440	124	100.00%		at least 19 illegal dry spilling days

Table 1: EDM annual summary spill data submitted to EA by Northumbrian Water for Allendale STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Allendale STW is a small works discharging into the River East Allen. WASP 's request to Northumbrian Water for spill and treatment data for Allendale STW on 13/12/2021 was refused on 2/2/2022 based for a second time on the EA investigation into WaSCs announced at the end of 221. WASP requested an internal review by Northumbrian Water which for a second time found in favour of WASP quoting the EA's clarification of fulfilment of EIR requests during its investigation:

> *Since the EIR Refusal, the Environment Agency issued a press release on 16th February. This can be accessed here: https://environmentagency.blog.gov.uk/2022/02/16/environment-agency-investigation-into-sewage-treatment-works/*
> *In this statement, the Environment Agency made it clear that it would continue to provide data on request in the vast majority of cases. It also pointed out that water companies are bound by the same Environmental Information Request requirements on the provision of data as is the Agency.* **Northumbrian Water**

The data was provided on the same day (28/03/2022) 3.5 months after the original request.

Before describing the full analysis of Allendale STW's performance, it is worth noting that although Allendale STW's total spilling hours reduced from 3,378 in 2020 to 2,440 in 2021, a reduction of 28%, the proportion of illegal dry spilling days increased from 9% to 11%. Furthermore, the oft repeated claim of spills of untreated sewage entering swollen rivers is not universally true. During some spills from Allendale STW in 2020, the river was little above its dry weather level (**Fig**. 1).

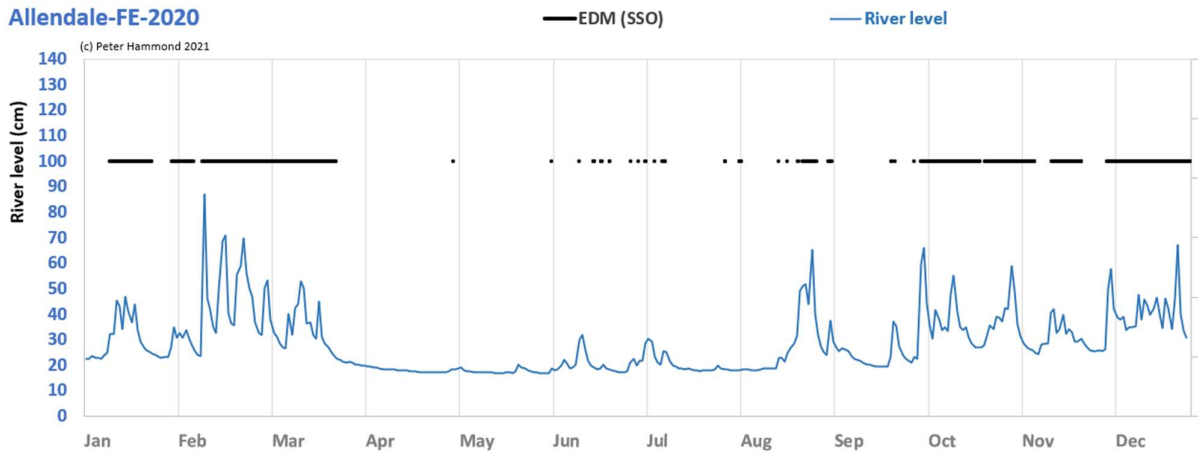


Figure 1: 2020 overview showing that receiving rivers may not be in full speight during spills

2018/2019

The EDM device was not installed until 2020, so there are no spill data available for 2018 and 2019. However, using the data for 2020 and 2021. However, WASP estimates there were at least 2,500 spilling hours in 2018 and over 2,000 spilling hours in 2019 (**Fig**. 2).

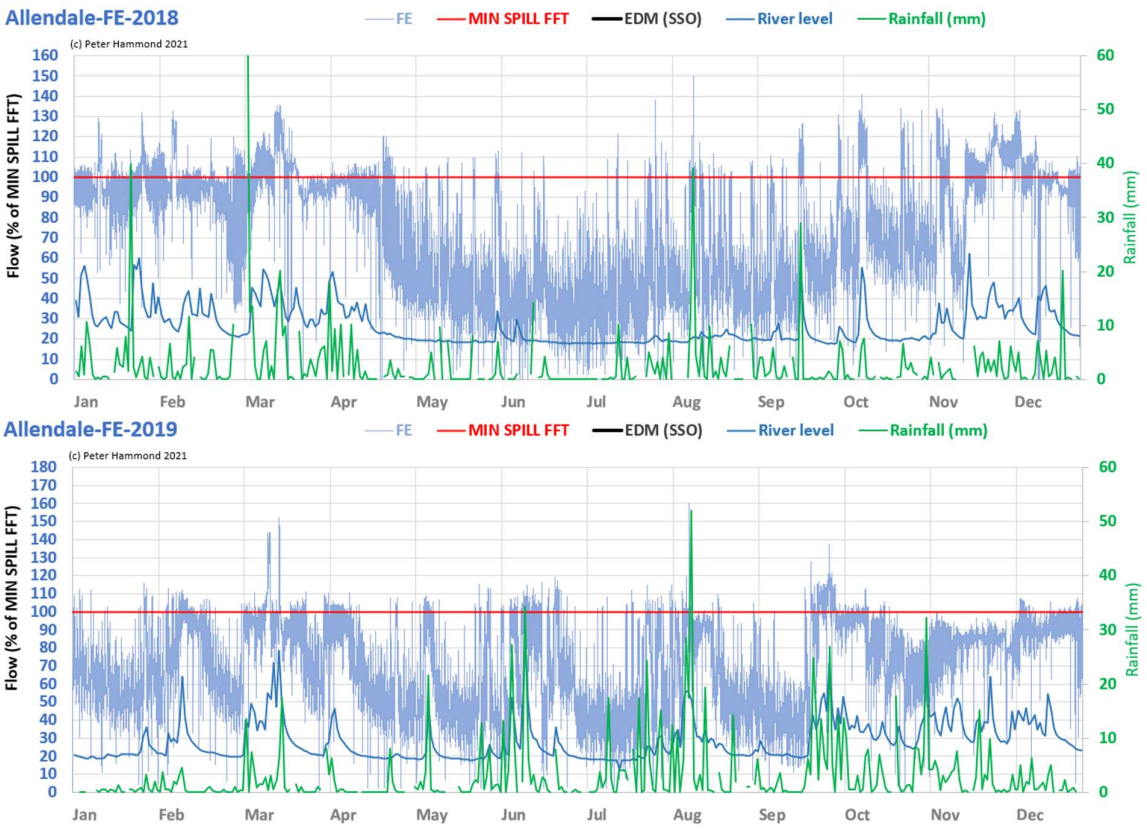


Figure 2: overview charts of sewage treatment, daily rainfall and river level for Allendale STW for 2018-2019

2020

As with 2018 and 2019, Allendale STW spilled for significantly long periods in 2020 (**Fig**. 3).

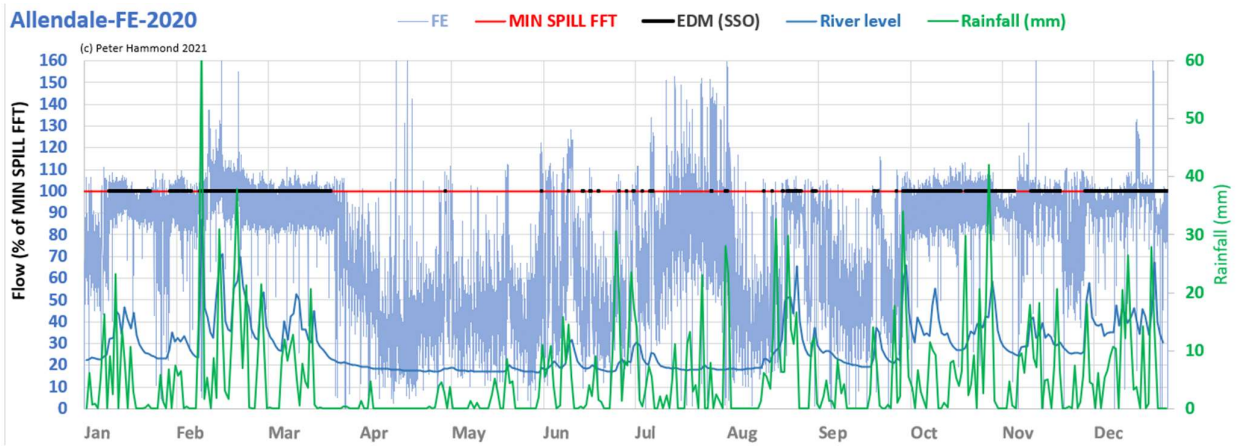


Figure 3: 2020 overview of treatment, spill and rainfall data for Allendale STW

WASP believes there were at least 15 illegal dry spilling days in 2020. Some examples are shown in **Fig**. 4.

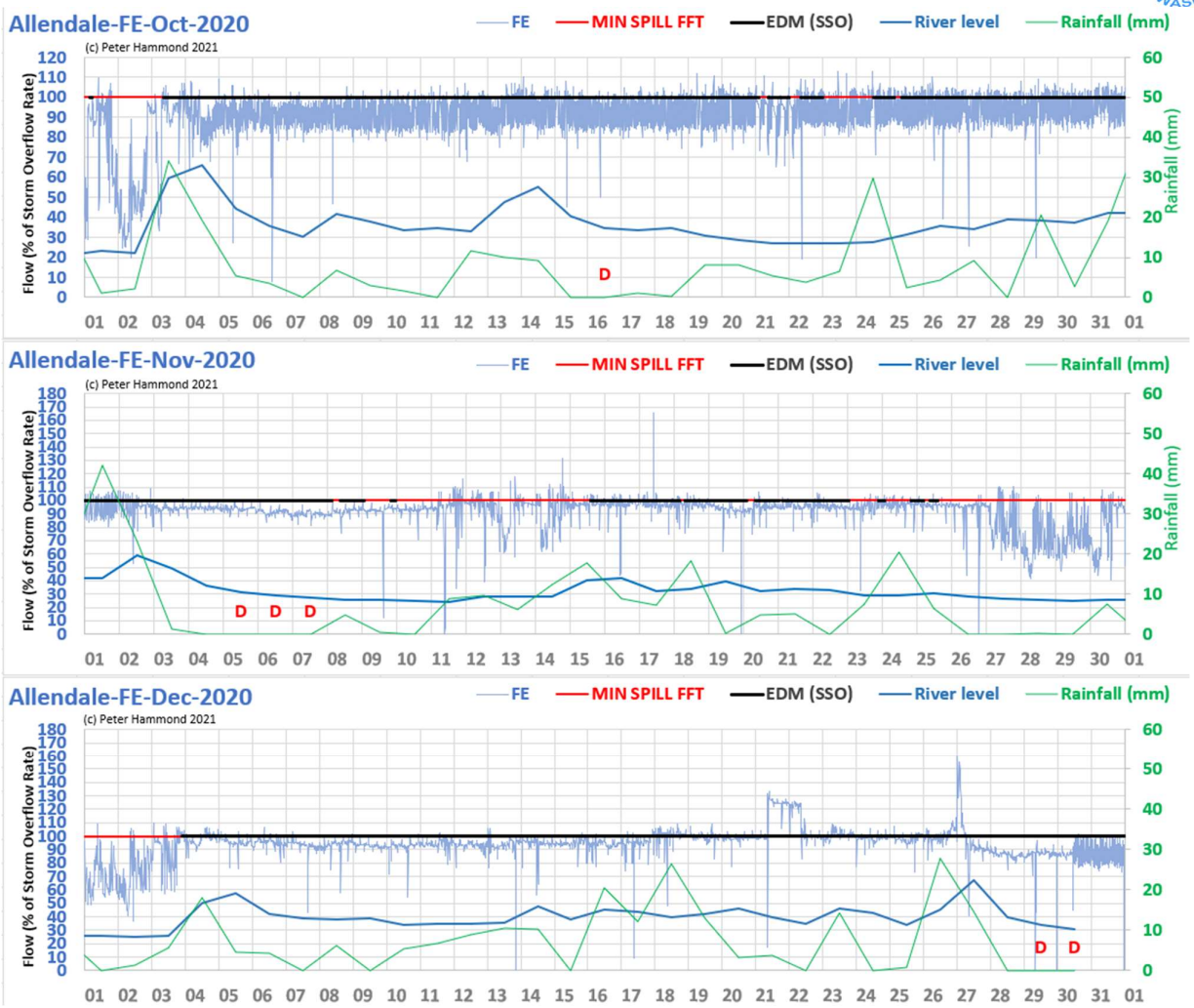


Figure 4: WASP believes there were illegal dry spills (labelled D) on Oct 16, Nov 5-8 and Dec 29-30 in 2020

2021

The 2021 overview for Allendale STW confirms the continuation of a spill from December 3rd 2020 until the end of February 2021 (**Fig**. 5), almost three months of spilling untreated sewage without a break.

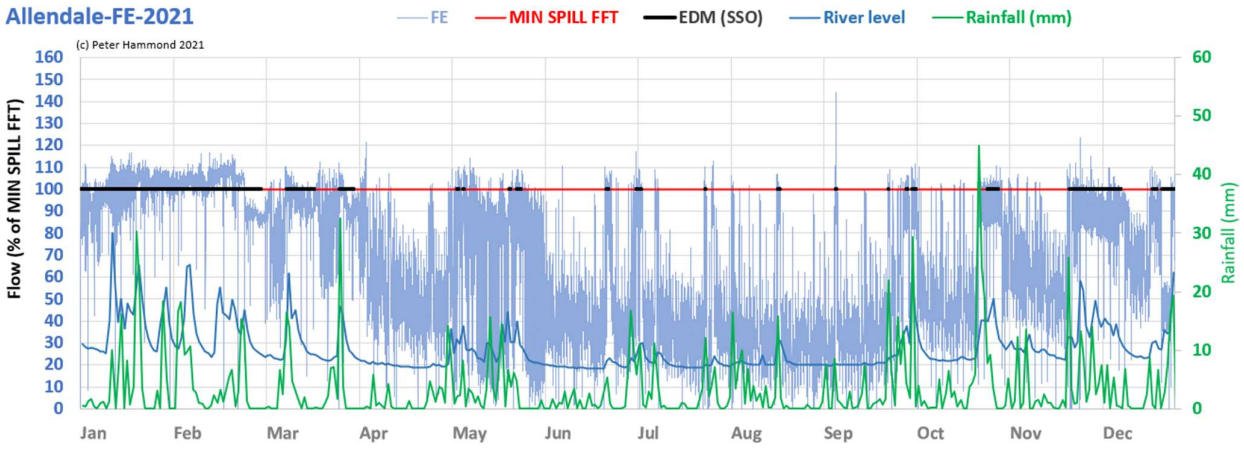


Figure 5: 2021 overview of treatment, spill and rainfall data for Alendale STW

WASP believes there were 19 illegal spilling days at Allendale STW in 2021. Some of the illegal dry and early spills are shown in **Fig**. 6.

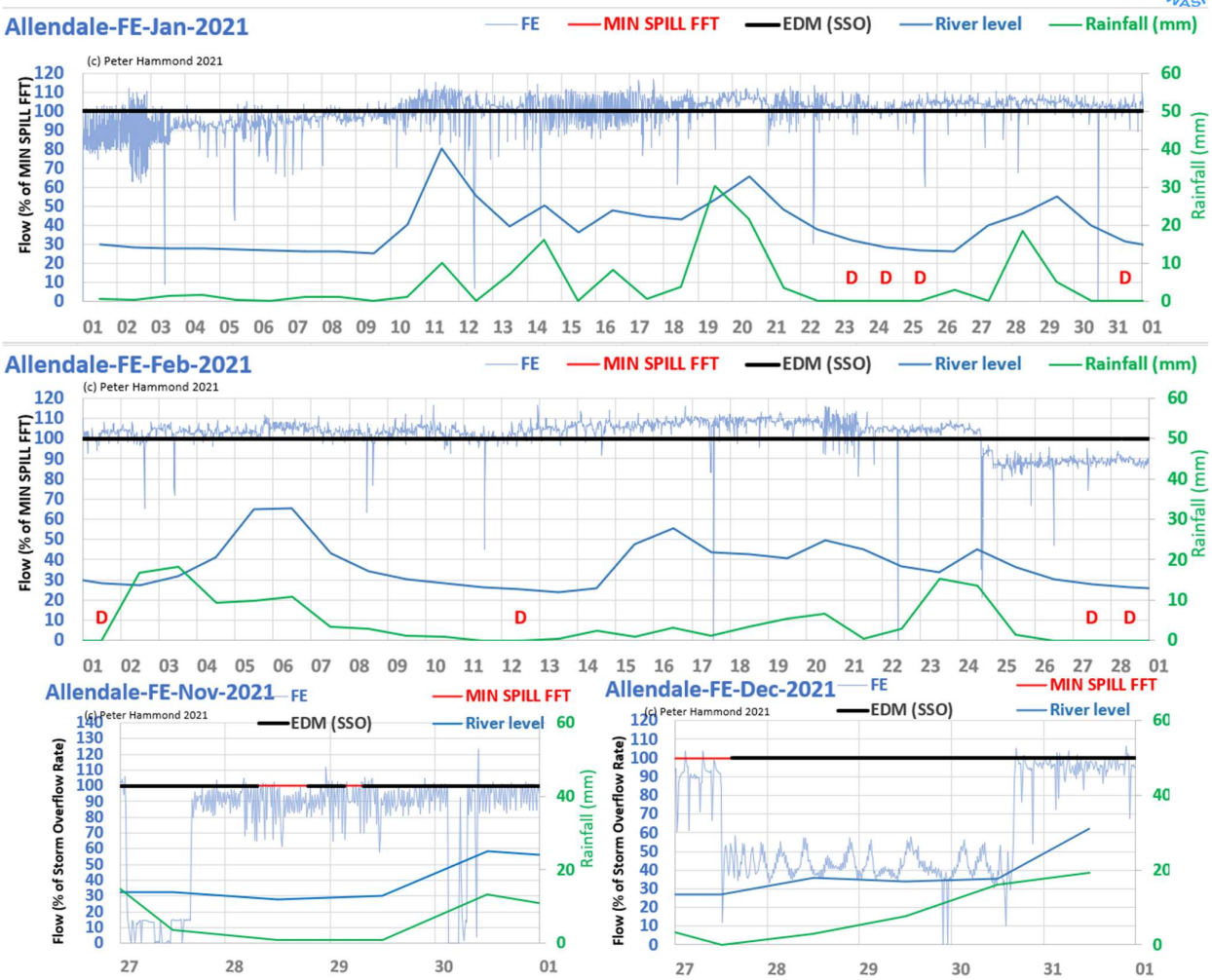
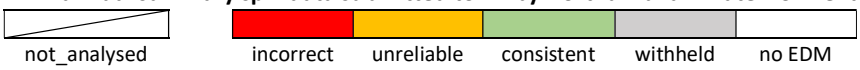


Figure 6: WASP believes that at Allendale STW in 2021 there were 13 illegal dry spilling days (including Jan 23-25, 31; Feb 1,12,27-28) and 6 illegal early spilling days (Nov 27,30; Dec 27-30)

Hendon STW – NORTHUMBRIAN WATER (NW)

year	hours	spills	active	comments	WASP beliefs/facts
2018					Local campaigners obtained EDM data Estimated 503 spilling hours
2019					Local campaigners proved EDM report false 600 spilling hours at least 14 illegal spilling days
2020	109.14	33			Local campaigners proved EDM report false further 300+ spilling hours at least 19 illegal spilling days
2021	565.44	116	100.00%		at least 6 illegal spilling days

Table 1: EDM annual summary spill data submitted to EA by Northumbrian Water for Hendon STW



Hendon STW serves a population equivalent of over 210,000. Its discharge outlet is offshore in the North Sea. In recent years, the operation of Hendon STW has been subject to close scrutiny by local campaigners, Bob Latimer and Steve Lavelle. They have already established that unreliable EDM spill data for Hendon STW was reported to the EA by Northumbrian Water (NW) in 2018/2019. Briefly, a first set of spill data for the period 1/4/2019 to 31/3/2020 provided to them by the EA showed a total duration of about 16 hours. After Steve Lavelle challenged this figure, the EA produced a second dataset (presumably originating from NW) for the same period corresponding to 646 hours. Here, we show that for 3 of the 4 years 2018-2021, there are major discrepancies between the EDM spill data submitted to the EA by NW and that obtained by Steve Lavelle. In addition, WASP believes there is evidence of many illegal spills.

On April 27th 2022, WASP submitted an EIR request to NW for all individual spill start/stop times for every overflow included in its EDM submissions to the EA for 2020 and 2021. NW provided the data in the form of a spreadsheet on May 4th 2022, along with the comment:

> *Please note that we make no guarantees as to the accuracy of this information and it should not be relied upon for any purpose.*

For Hendon STW, NW provided detailed spill data for 2021 but not for 2020.

In addition, WASP has been able to access flow to treatment and final effluent flow data for 2015 to 2021 provided by NW to Steve Lavelle via EIR-21073.

2021

WASP's analysis has confirmed that the 2021 spilling hours total submitted to the EA by NW for Hendon STW is consistent with that derived from the detailed spill data provided to WASP. However, from the spill data provided by NW directly to WASP and the flow data provided to Steve Lavelle, it appears that Hendon STW failed to maintain compliant flow to full treatment on at least 6 days in 2021. In **Fig**. 1, the black horizontal segments denote spill intervals and their location on the vertical axis corresponds to 100% of the minimum, continued flow to treatment level (1,856 l/s) that is required for permit compliance during a spill. WASP believes illegal, early spilling occurred in 2021 on February 20th, 21st, 22nd, 24th; May 25th; and, on December 9th.

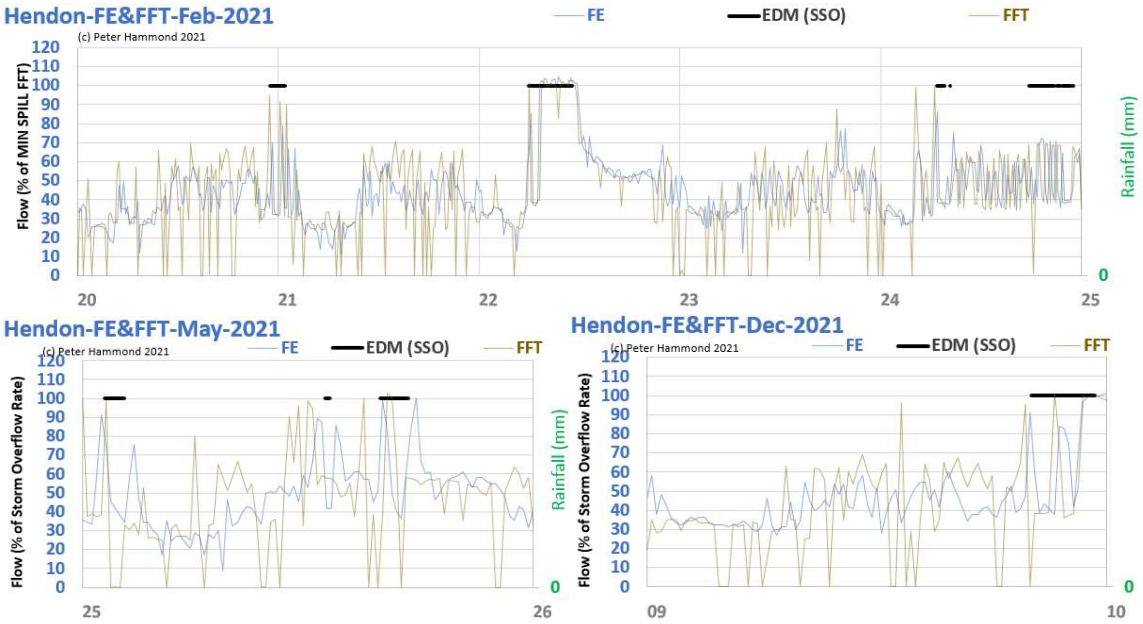


Figure 1: WASP believes illegal, early spills occurred on at least 6 days in 2021 at Hendon STW

2020

In the 2020 spill data submission by NW to the EA, no figure for spilling hours for Hendon STW was provided but a comment was included as follows:

"Monitor present. Data for 2019 under review between EA and NWL. Agreed monitoring data will follow in the bespoke annual return."

The two data series in the figure below contain extracts for 2020 dates and lengths of spills at Hendon STW provided by the EA to Steve Lavelle on separate occasions (in an inconvenient PDF format). The left extract simply gives the date of the spill and its length in hours and minutes. The right extract gives the spill start and stop times as well as length of the spill in hours, minutes and seconds.

09/01/2020	06:21
13/01/2020	00:08
14/01/2020	00:02
09/02/2020	01:41
12/02/2020	00:10
13/02/2020	00:30
15/02/2020	00:46
22/02/2020	00:31
24/02/2020	00:08
08/03/2020	00:01
11/03/2020	00:45

Spill dates and lengths in hrs:mins
(from 2019-20 report.pdf)
Totalling 4.7 hrs

09/01/2020 02:10:21	09/01/2020 08:40:41	6:30:20
09/01/2020 08:43:01	09/01/2020 08:47:11	0:04:10
09/01/2020 08:51:51	09/01/2020 16:54:01	8:02:10
09/01/2020 20:43:01	09/01/2020 21:38:11	0:55:10
12/01/2020 11:49:41	12/01/2020 13:35:31	1:45:50
13/01/2020 18:21:31	13/01/2020 20:44:01	2:22:30
14/01/2020 14:54:01	14/01/2020 18:59:31	4:05:30
16/01/2020 21:58:41	16/01/2020 23:10:00	1:11:19
01/02/2020 19:57:31	01/02/2020 21:11:51	1:14:20
09/02/2020 00:34:51	09/02/2020 02:43:11	2:08:20
09/02/2020 05:06:01	09/02/2020 18:47:21	13:41:20
13/02/2020 06:20:41	13/02/2020 11:38:11	5:17:30
13/02/2020 13:18:31	13/02/2020 15:38:11	2:19:40
15/02/2020 18:08:31	16/02/2020 14:34:41	20:26:10
16/02/2020 18:32:21	16/02/2020 20:25:00	1:52:39
20/02/2020 10:47:01	20/02/2020 11:21:21	0:34:20
20/02/2020 11:40:31	20/02/2020 12:45:11	1:04:40
22/02/2020 03:31:11	22/02/2020 05:25:00	1:53:49
23/02/2020 07:58:21	23/02/2020 08:20:41	0:22:20
24/02/2020 05:58:21	24/02/2020 18:41:11	12:42:50
24/02/2020 19:04:11	24/02/2020 20:15:01	1:10:50
28/02/2020 05:29:11	28/02/2020 08:55:00	3:25:49
28/02/2020 14:27:01	28/02/2020 15:07:01	0:40:00
29/02/2020 21:20:41	29/02/2020 22:40:00	1:19:19
08/03/2020 05:05:01	08/03/2020 06:28:11	1:23:10
09/03/2020 20:02:01	09/03/2020 21:44:01	1:42:00
09/03/2020 22:32:11	09/03/2020 23:22:51	0:50:40
11/03/2020 16:44:21	11/03/2020 17:49:41	1:05:20
11/03/2020 18:53:31	11/03/2020 22:35:41	3:42:10
12/03/2020 21:41:31	12/03/2020 22:43:31	1:02:00
28/03/2020 16:04:31	28/03/2020 17:36:21	1:31:50
31/03/2020 04:18:41	31/03/2020 06:34:51	2:16:10
31/03/2020 08:40:00	31/03/2020 09:03:21	0:23:21

Spill dates and lengths in hrs:mins:secs
(from Copy of Hendon Return 2019_20_EA Sent.pdf)
Totalling 109.14

Figure 2: two extracts of EDM spill times and lengths for Hendon STW provided to Steve Lavelle on separate occasions

Clearly, the extracts do not agree and it is assumed that NW provided incorrect data on the first occasion that was subsequently challenged and replaced. WASP initially used the second extract in its analysis. But when, on July 15th 2022, NW responded positively to a WASP EIR request for 2020 detailed spill data, the new data was used. An overview of final effluent (FE), flow to full treatment (FFT), settled storm overflow (SSO) and rainfall data is given in **Fig**. 3. The new data confirmed WASP's estimate and increased the annual spilling hours to 425.

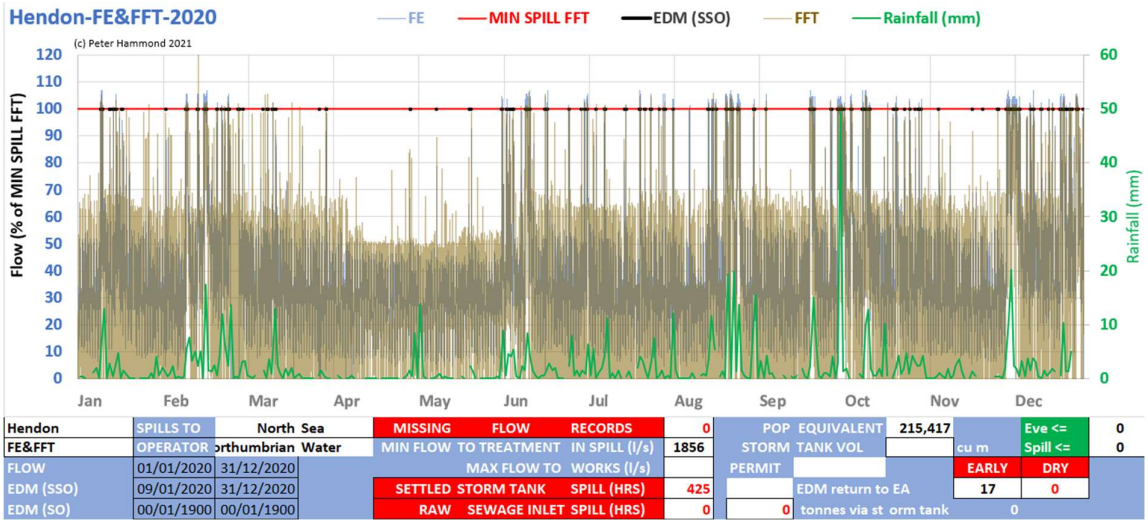


Figure 3: overview of flow, spill and rainfall data for 2020 for Northumbrian Water's Hendon STW

WASP believes there were at least 19 days when illegal, early spills occurred.

Figure 4: WASP believes there were illegal, early spills from Hendon STW on at least 19 days in 2020 (Jan 12th, 13th,16th; Feb 22nd, 28th, 29th; Mar 8th, 9th, 11th, 12th; May 22nd, 23rd; Nov 1st, 30th; Dec 3rd, 12th, 25th, 26th, 27th)

2019

The EDM spill data provided to Steve Lavelle by Northumbrian Water for Hendon STW for 2019 is a mix of spill dates and lengths for the first 3 months of the year totalling 60.38 hours (**Table** 2) and individual start-stop times for the remaining 9 months totalling 535.59 hours (overview **Fig**. 5).

Date	Spill length (hrs)	Date	Spill length (hrs)	Date	Spill length (hrs)	Date	Spill length (hrs)
01/02/2019	1.33	08/02/2019	1.55	03/03/2019	6.80	09/03/2019	0.85
02/02/2019	0.57	09/02/2019	1.07	04/03/2019	8.65	10/03/2019	1.70
05/02/2019	1.57	11/02/2019	3.50	06/03/2019	9.75	16/03/2019	10.40
07/02/2019	9.23	20/02/2019		08/03/2019	1.00	30/03/2019	0.35

Table 2 Spill dates and lengths for Hendon STW for 1/1/2019 to 31/3/2019
(Totalling 60.38 hours)

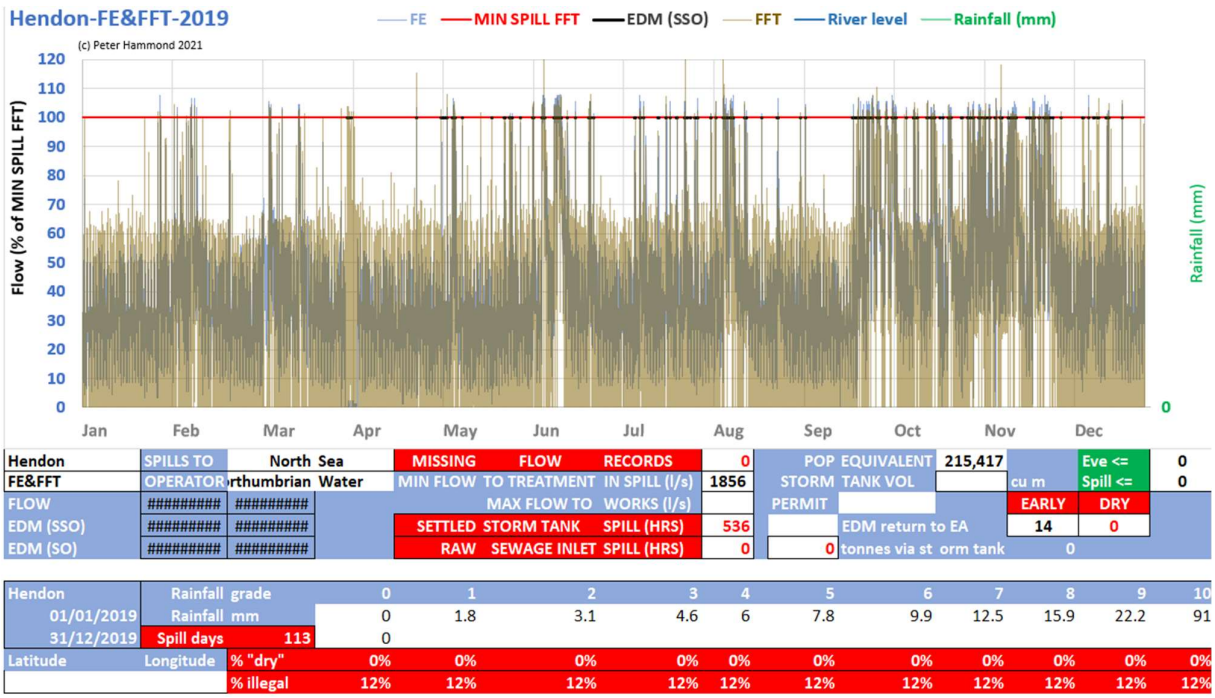


Figure 5: annual overview of flow to treatment, final effluent flow and EDM spill data for Hendon STW

Northumbrian Water did not submit any EDM spill data to the EA for 2019 for Hendon STW despite providing data to Steve Lavelle suggesting almost 600 spilling hours for the year. WASP believes that the sewage flow data and EDM spill data are consistent with this annual spilling total. WASP also believes that there were illegal, early spills on at least 14 days at Hendon STW in 2019 (**Fig**. 6).

2018

From data provided by the EA to WASP, it appears that Northumbrian Water was the only water company in England and Wales not to submit any EDM spill data to the EA in 2018 for any overflows. The summary EDM spill data (dates and lengths of spills) provided to Steve Lavelle correspond to 101 individual spills totalling 502.92 spilling hours. Without the detailed spill start-stop times, it is not possible to determine their compliance with the EA permit.

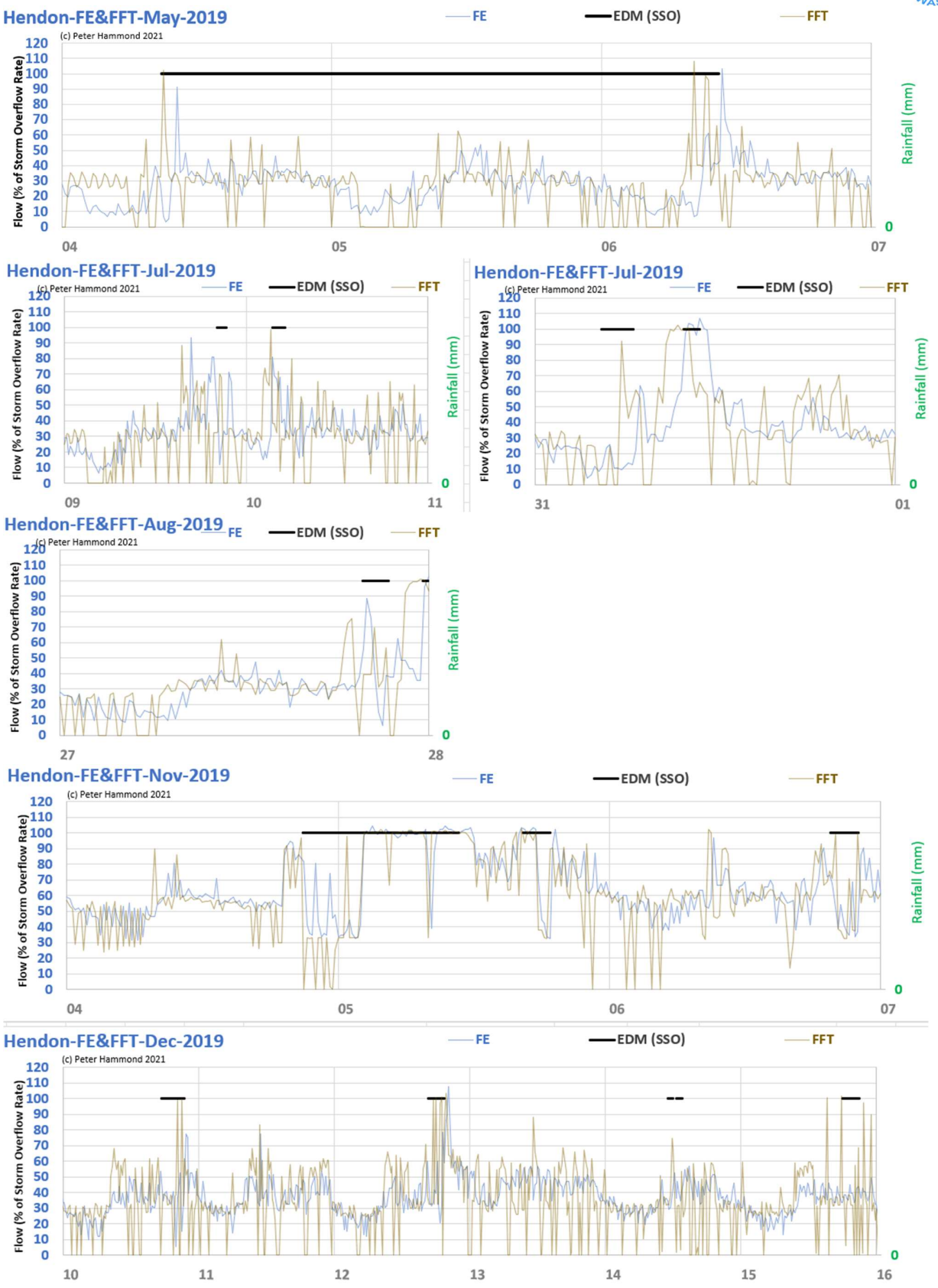


Figure 6: WASP believes there were illegal, early spills on at least 14 days at Hendon STW in 2019
May 4th, 5th, 6th; July 9th, 10th, 31st; August 27th; November 4th, 5th, 6th; December 10th, 12th, 14th, 15th

Tudhoe Mill STW– NORTHUMBRIAN WATER (NW)

year	EDM SUBMISSION TO EA hours	spills	active	comments	WASP beliefs/facts
2018					
2019	SSO: 622 Inlet SO: 220	SSO: 78 Inlet SO:62	SSO: 100.00% Inlet SO: 100.00%		At least 6 illegal spilling days up to 165 M litres spilled
2020	SSO: 479 Inlet SO: 171	SSO: 63 Inlet SO:46	SSO: 100.00% Inlet SO: 100.00%		At least 4 illegal spilling days up to 131.5 M litres spilled
2021	SSO: 896 Inlet SO: 232	SSO: 82 Inlet SO:65	SSO: 100.00% Inlet SO: 100.00%		

Table 1: EDM annual summary spill data submitted to EA by Northumbrian Water for Tudhoe Mill STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Tudhoe Mill STW serves a population equivalent of over 122,000 and discharges into Valley Burn, a tributary of the River Wear. It has been working at between 96.8% and 100% of capacity for 10 years. The works has both an inlet storm overflow and a storm tank overflow. When both overflow weirs are active, the inlet allows 435 l/s into the works of which at least 198.8 l/s should receive full treatment while a storm tank spills up to 243.4 l/s excess.

2019

The inlet storm overflow spilled for 622 hrs and the storm tank overflow for 220 hrs and both were active simultaneously for 194.1 hours. This suggests **up to 165 million litres of screened but untreated sewage were discharged to the adjoining watercourse**. It is not possible to estimate spill volume at the inlet.

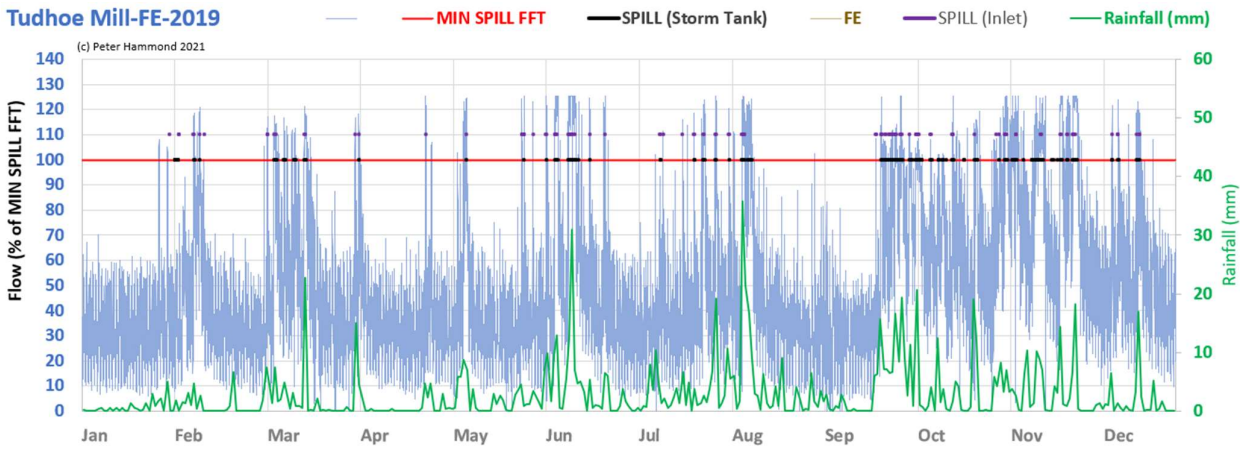


Figure 1: 2019 overview of sewage treatment, spill and daily rainfall data for Tudhoe Mill STW

WASP believes there were 6 illegal spilling days at Tudhoe Mill STW (**Fig**. 2).

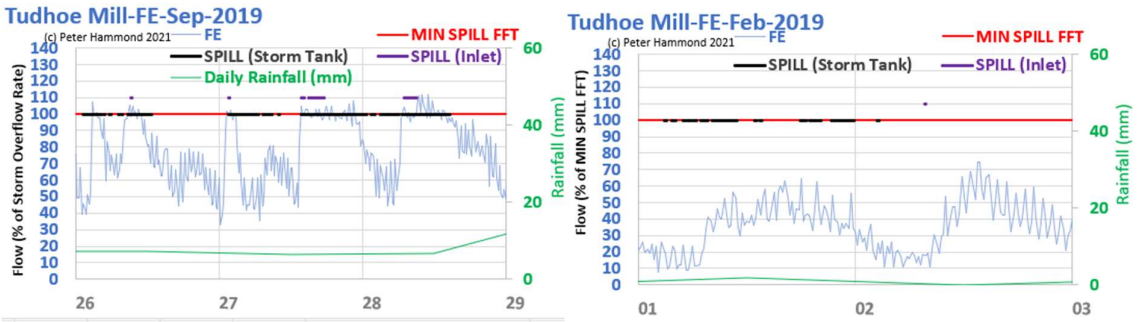


Figure 2: WASP believes there were illegal spilling days in 2019 (including Sep 26-28; Feb 1-2)

2020

The inlet storm overflow (hrs) and storm tank overflow were active simultaneously for 154.6 hours which means **up to 131.5 million litres (or of screened but untreated sewage was discharged to the adjoining watercourse**. It is not possible to estimate how much was spilled at the inlet.

Generally speaking, Tudhow Mill STW does not appear to spill "early" but in each of the first 3 months of 2020 there was a "zero" flow (or close to it) which suggests that the storm discharge containing it was illegal. These occurred on January 9th, February 9th and March 11th. Even a short flow gap at such a large works could lose a significant spill and at other works has been associated with pump failure often due to temporary blockage.

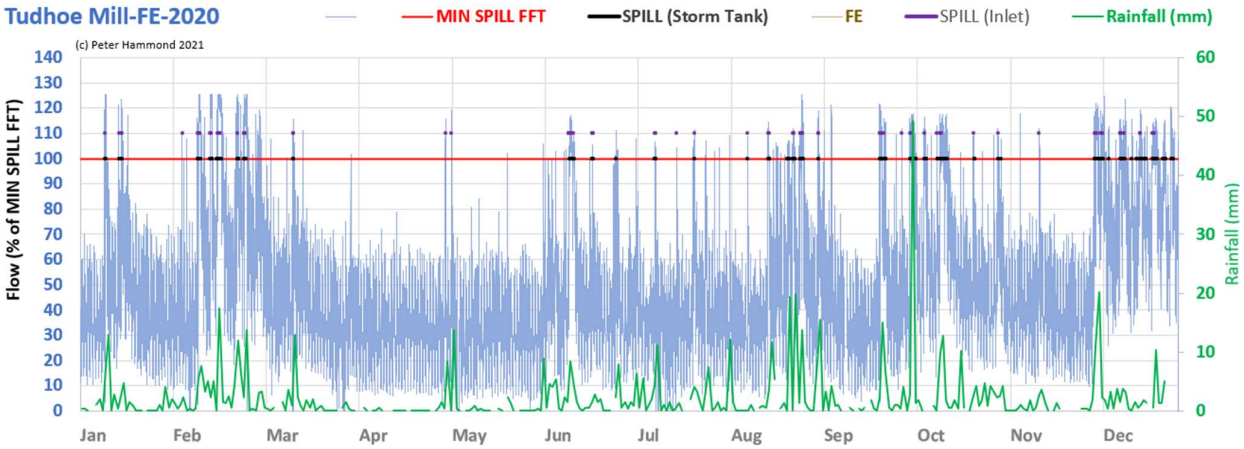


Figure 3: 2020 overview of sewage treatment, spill and daily rainfall data for Tudhoe Mill STW

WASP believes there were 6 illegal spilling days in 2020 at Tudhoe STW (**Fig**. 4).

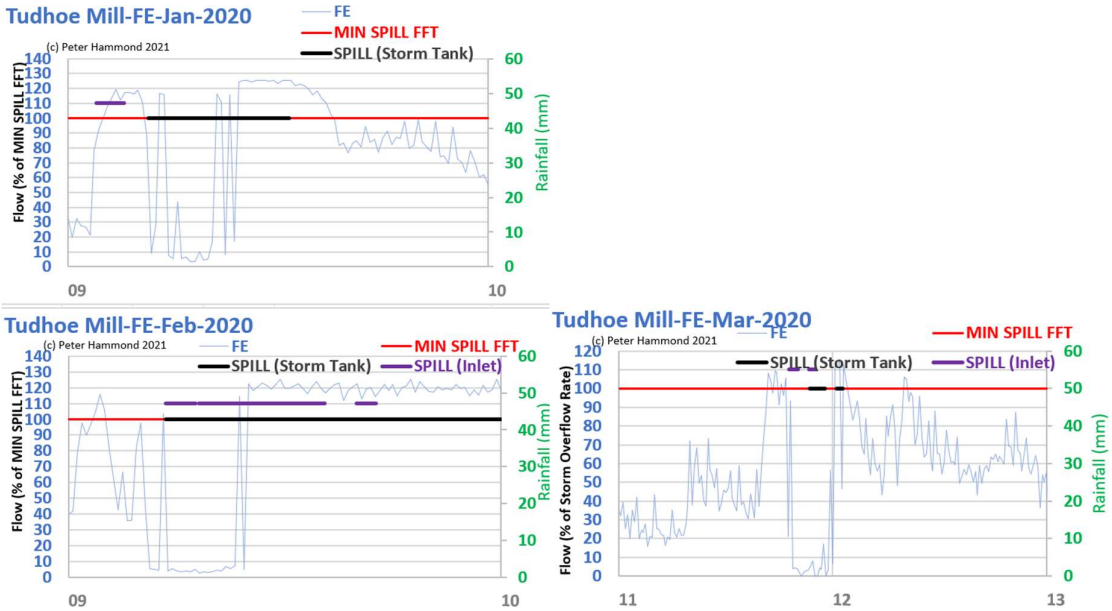


Figure 4: WASP believes there were 6 illegal spilling days at Tudhoe Mill STW including Jan 9; Feb 9, Mar 11-12

Vinovium STW (Bishop Auckland) - NORTHUMBRIAN WATER (NW)

EDM SUBMISSION TO EA					
year	hours	spills	active	comments	WASP beliefs/facts
2018					at least 250 spilling hours
2019					at least 300 spilling hours
2020	592.40	47	99.93%		at least 240 additional spilling hours at least 37 illegal spilling days
2021	836.11	77	96.20%	Commissioned in 2020 - full year data expected	

Table 1: EDM annual summary spill data submitted to EA by Anglian Water for Ely New STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Vinovium STW serves a population of over 40,000 and discharges to the River Wear near Bishop Auckland. During the making of BBC Panorama's *The River Pollution Scandal*, presenter Joe Crowley submitted an EIR request to NW for treatment and spill data for Vinovium STW. In response, NW confirmed that the treatment data provided corresponded to flow to full treatment:

> *Willington and Bishop Auckland (Vinovium) flow meters are at the inlet works and have a discharge to storm tanks just upstream. Please note that we make no guarantees as to the accuracy of this information and it should not be relied upon for any purpose.* **Northumbrian Water**

Previously, in September 2020, NW refused WASP's EIR request for a list of STWs fitted with a meter measuring flow to full treatment giving the following reason:

> *There are currently no permit requirements to monitor FFT at our STWs.* **Northumbrian Water**

2020

The sewage treatment at Vinovium STW during dry weather conforms to the usual diurnal pattern (Fig. 1, January). Before the EDM device was commissioned at Vinovium STW in 2020, the spills of untreated sewage from its storm tank appear to comply with its permit defined capacity (e.g., Feb 8-10,13,15-18,21-26, **Fig**. 1).

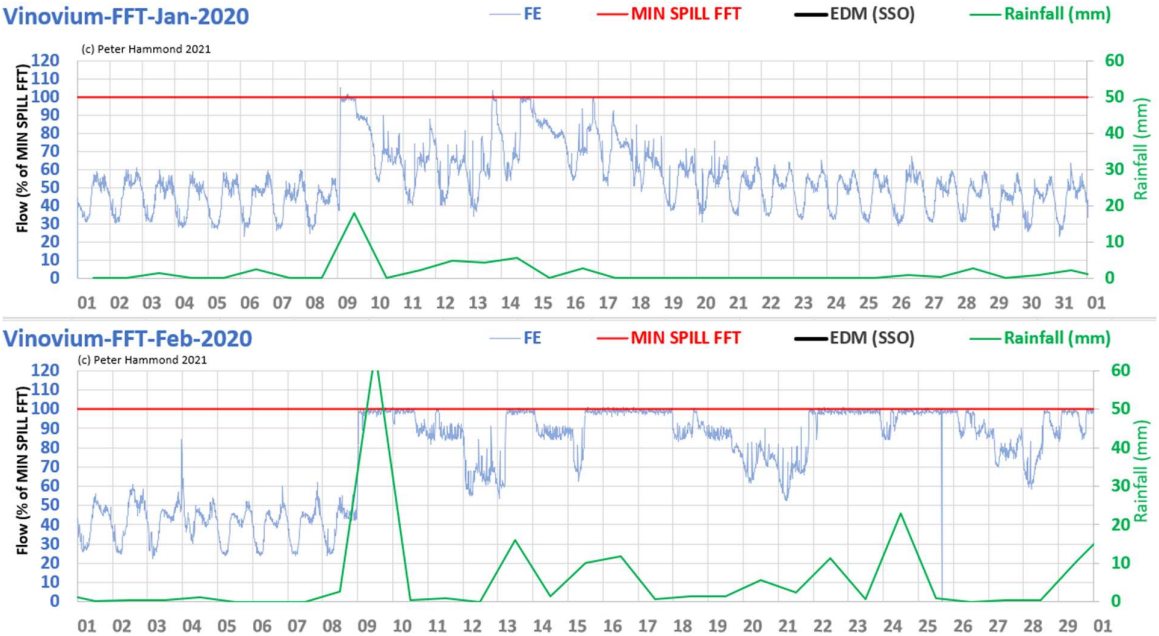


Figure 1: Monthly charts of sewage treatment spills and rainfall at Vinovium STW showing typical diurnal pattern (Jan'20) during dry weather and apparently compliant treatment during spills (Feb'20)

However, following the installation of the EDM, the detailed spill data suggest that many spills continue even when the treatment rate has reduced to below the compliant rate (**Fig**. 2). As a result, WASP believes there were 37 illegal spilling days in 2020 at Vinovium STW.

Figure 2: WASP believes there were 37 illegal spilling days at Vinovium STW in 2020 (Oct 5-6,9,12-13,16,21-22,24; Nov 1-3; Dec 6-10,12-31)

2018-2019

Before 2020, no EDM spill data are available but WASP believes the total spilling hours were more than 250 and 300 hours respectively for 2018 and 2019.

Willington STW - NORTHUMBRIAN WATER (NW)

EDM SUBMISSION TO EA					
year	hours	spills	active	comments	WASP beliefs/facts
2018					
2019					
2020	235.20	18	100.00%	Installed 16/04/20	11 illegal spilling days
2021	#N/A	#N/A	0.00%	Installation set-up/design issue N/A - Ongoing investigation	No discharges (NW to WASP)

Table 1: EDM annual summary spill data submitted to EA by Anglian Water for Ely New STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Willington STW serves a population of between 9,000 and 10,000 and according to the EU WWTD database has been working at full capacity for more than 10 years.

2020

The 2020 overview for Willington STW (**Fig**. 1) suggests that there were spills in February before the EDM device was installed.

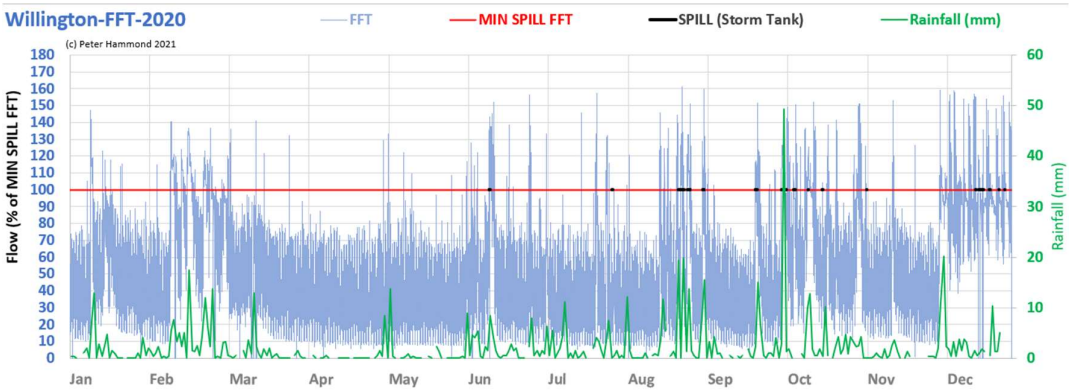


Figure 1: 2020 overview chart for Willington STW showing treatment, spill and rainfall data

WASP believes there were 11 illegal spilling days at Willington STW in 2020. Some are shown in **Fig**. 2.

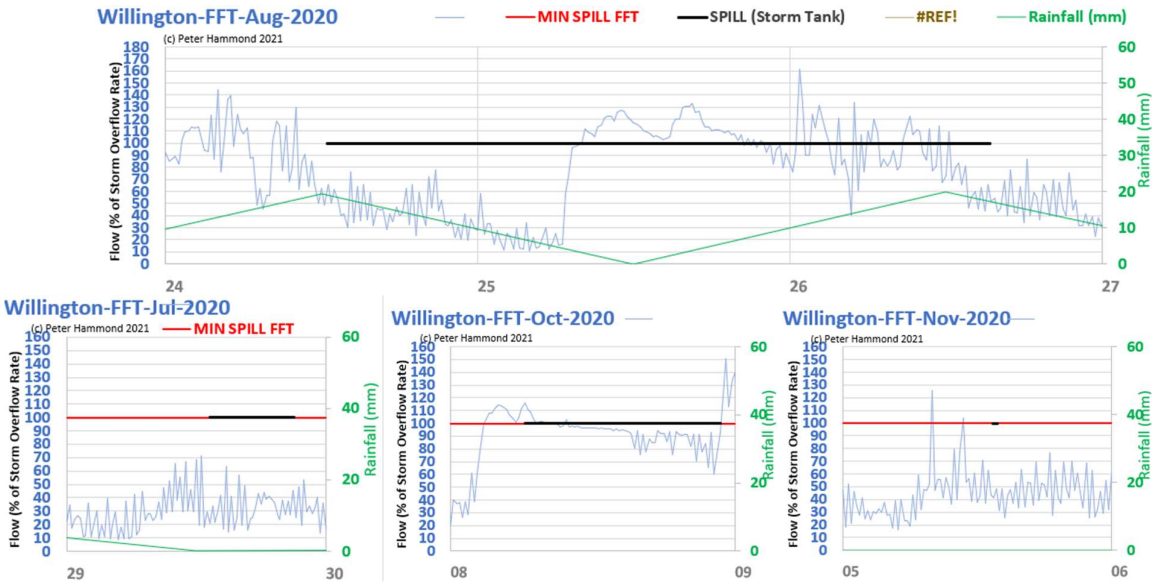


Figure 2: WASP believes there were 6 illegal spilling days in 2020 at Willington STW (Jul 29; Aug 24-26; Oct 8; Nov 5)

SEVERN TRENT WATER (SvT)

Transparency and openness

In WASP's experience, Severn Trent Water (SvT) is the least co-operative and least transparent of all 10 water companies in England and Wales. SvT ignored EIR requests that WASP submitted on 24/02/2021 and by so doing broke the law. An EIR request by a resident of Ludlow STW on 20/12/2019, in the days when SvT required requests to be submitted by a written letter, was ignored. This was followed up by WASP's EIR request which was also ignored[12]. It took 10 months before a reply was received and only after local MP Philip Dunne intervened. Even then, the data supplied to him was incomplete and another follow-up was necessary.

Most importantly, SvT ignored WASP's request in 2020 of 25/02/2020 for a list of all of its STWs where flow to full treatment is metered and recorded. A request for an internal review was also ignored. By not responding, SvT broke the law once again. The list was eventually provided over a year later. As a result, WASP has had great difficulty in reviewing the compliance of SvT's treatment works with respect to EA discharge permits.

On October 13th 2021, the House of Commons Environmental Audit Committee interviewed several water company CEOs, including SvT's CEO Liz Garfield. In the following extract from the Hansard transcript, Liz Garfield set out what she believed is SvT's position on transparency, data access and EIR response. The EAC final report described her comments as disingenuous.

Q449 **Chair:** But the evidence that we have had in this inquiry is that all of you—the whole industry—is susceptible to the same challenge, which is that **you are extremely reluctant to provide the information that you have to inquiries from members of the public and particularly from campaigners**, who are trying to understand the nature of the water quality that they are trying to use or enjoy.

Liv Garfield: I just checked before I came in and **all of that data is available on our website** ... We built a website specifically to make sure that every piece of data is transparently available…

Q450 **Chair:** Does that mean that you will be publishing responses to environment information requests?

Liv Garfield: The key ask was, "Let me have the data as you have it, so that I have the same eyes and ears as you have". That is what we have done, exactly that, so **anybody can see the same data that I have on exactly the same information**. That is what is live on the website. That is what we have done. The ask to date has been that.

Q451 **Chair:** So the days when you require a freedom of information request to get an analysis out of you are over as far as Severn Trent is concerned?

Liv Garfield: That is exactly what I believe. I don't want to be receiving freedom of information requests either and then have my teams poring all over, providing data to somebody. I want them to be getting on and getting river quality to be amazing, so **we decided to make all that information available, then it is for anybody who would like to look at it to be able to access that data**. **https://committees.parliament.uk/oralevidence/2936/pdf/**

WASP checked what permit compliance and sewage spill related data was then available on SvT's website. There was just one file which had the 2020 EDM total spilling hours and as is mentioned below a large number of the entries have some qualification on the completeness or reliability of the data. 2021 summary spill data has now been added. Unlike Wessex Water's excellent web pages providing open access to spill and flow data, for example, there are no individual start/stop times of spills, no sewage pumping station monitoring data and no STW treatment flow data. Moreover, there do not appear to be any data files related to SvT's EDM returns for 2017, 2018 and 2019.

More recently, in contrast to 8 sewerage companies who have provide the detailed EDM individual spill data for 2020 and 2021 (that are not on SvT's website), SvT refused to provide the data citing the current investigation by the EA into the water industry. It should be said that SvT is not one of the 6 water companies explicitly named in the EA's investigation. Also, on July 14th 2022, the EA announced the results of its annual Environmental Performance Assessment and allowed SvT to maintain a 4 star rating.

The comments by CEO Liz Garfield are not consistent with the content of SvT's website nor with WASP's experience of dealing with the company. Its 4*rating is not consistent with its lack of data transparency.

[12] https://www.whatdotheyknow.com/user/peter_hammond

Claymills STW - SEVERN TRENT WATER (SvT)

year	hours reported	counted spills	EDM active	SvT - comments	WASP beliefs/facts
2018	-	-		-	At least 10 illegal spilling days
2019	-	-		-	At least 20 illegal spilling days
2020	4,773.4	218	100.00%	Maintenance issues have been identified at this site and maintenance tasks are scheduled to improve data quality for next year's return	At least 6 illegal spilling days
2021	8.36	3	14.52%	Sensor failure / issue Resolved - November	At least 200 spilling hours

Table 1: EDM annual summary spill data submitted to EA by Northumbrian Water for Hendon STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Claymills STW was brought to WASP's attention in May 2021 by Surfers Against Sewage and British Canoing. The latter had been contacted by a member concerned about the state of the River Trent where he frequently canoed and into which Claymills STW discharges final effluent and storm tank overflow via a single outlet. Claymills STW serves a population of about 100,000 and around three quarters of its total load is trade sewage associated with brewing and coffee[13]. It is worth noting that its storm tank volume at 7,050 cu m is undersized by 25%. Using the EA requirement of capacity sufficient cope with 2 hours' worth of sewage at the storm overflow rate, it should be 9,389 cu m. A storm of the correct size would reduce both frequency and length of spills.

EA confusion about the discharge permit for Claymills STW

WASP began its review of Claymills STW by consulting the EA's Public Register of discharge permits. The most recent Claymills permit of 2014 was an update of a 2010 permit but unfortunately the EA could not find a copy of it and replied as follows:

> *Regarding the revised permit document from 2014 the most recent permit we have on our DMS Public Register System is for 2010 that was the copy that was sent through to you. We have checked the permit folders for other permits at Claymills but can't see anything from around that time. For whatever reason it looks like the 2014 revision wasn't put on our public register system EDRM at the time.* **Environment Agency**

Without an up-to-date copy of the discharge permit, compliance checking by WASP and presumably also by the EA is not possible. After requesting an internal review into the missing permit, the following response came a few days later from the EA:

> *Please find attached modification of permit T/24/36133/R which is dated 14/10/08. However, **please note**: that the conditions related to UWWTR come into effect on 30/09/14 as specified within the permit* **Environment Agency**

The metadata of the permit PDF file provided says it was created on the day it was sent and on inspection it referred to a modification on 14th October 2008 with a signature next to a "modification served date 26th March 2010" at the end of the document. In between these, is a clause starting with the sentence "As from the 30th September 2014 the permit is modified as follows". WASP has accepted the EA's word that this is the current permit.

Significant anomalies in historical sewage treatment data at Claymills STW

After some delay, the 15-min MCERTS effluent flow and total daily flow data for 2015-2021 was eventually provided to the canoeist by Severn Trent Water (SvT). When charted, considerable anomalies are immediately

[13] https://www.stwater.co.uk/content/dam/stw/about_us/pr19-documents/sve_appendix_a9_drainage_and_wastewater_management_plan.pdf

obvious (**Fig**. 1). This was obviously apparent to SvT who in addition to the data provided the following comment:

> "*There are gaps in data through the period caused by flowmeter or telemetry equipment failure, the most recent notable example being 31st January to 2nd April 2020*" Severn Trent Water, July 2021

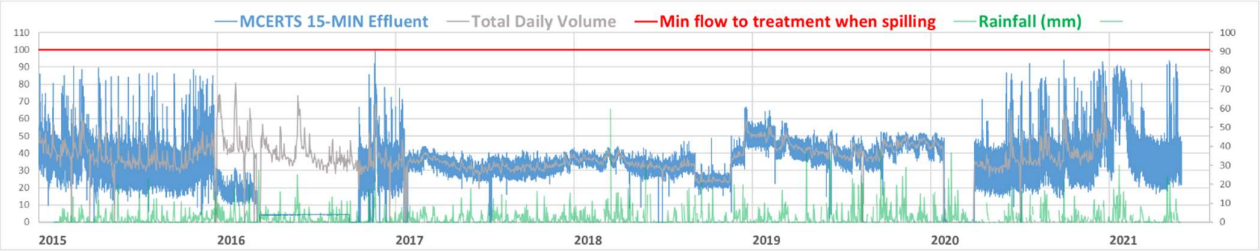


Figure 1: 15-min MCERTS effluent flow, total daily volume and rainfall at Claymills STW for 2015-2021

After being alerted to the large data gaps of 2016 and 2020, the following response was received from SvT:

> *The 6 months of flow data missing in 2016 was due to an outstation / radio link failure, we were able to retrieve data from the flow meter but these were only Total daily volumes and not instantaneous. The 2 months of missing flow data in 2020 was due to flow meter/ sensor failure, there was a delay replacing it due to a long lead time in getting kit from Germany. This has now been resolved by holding a unit "on the shelf" so we don't have to wait.* **Severn Trent Water**

Such gaps in data are permit breaches in themselves. The gap in February/March 2020 is particularly concerning as it was a period of high rainfall and so would have likely incurred sewage spills. Other anomalies in these data are the sudden drop/rise in sewage treatment in late 2018 and the greater degree of flow flatlining throughout 2017 and 2018 with little response to rainfall compared to that in 2015, 2016, 2019 and 2020.

2021

WASP did not obtain full sewage treatment or detailed spill start-stop times for 2021 before Severn Trent Water clamped down on fulfilling EIR requests by citing the EA's investigation of WaSCs. However, the first six months' data are informative as can be seen from the 2021 overview chart below.

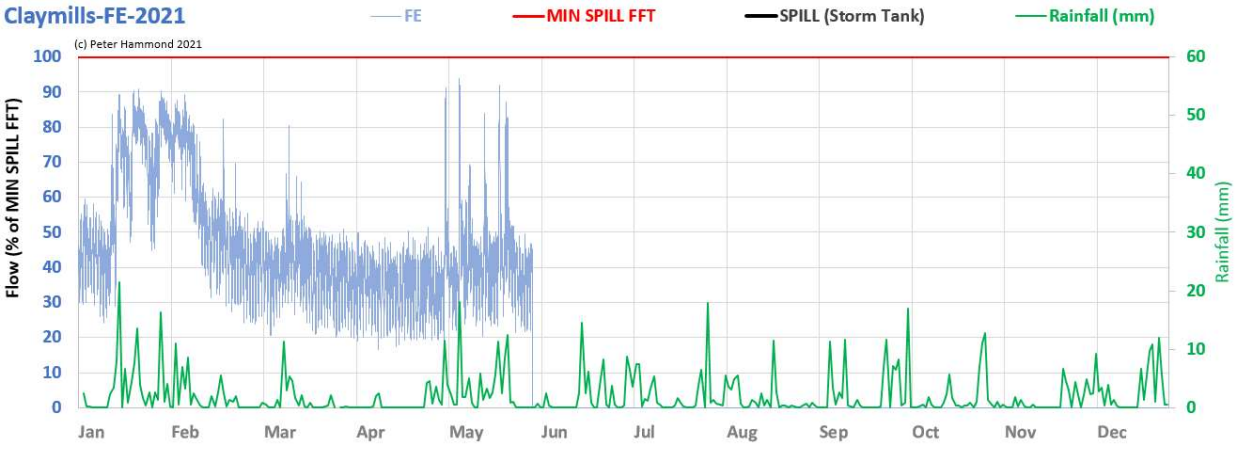


Figure 2: 2021 overview chart for Claymills STW suggesting untreated sewage spills occurred in January

The monthly charts for January and February (Fig. 3) show signs of classic flattening of the sewage treatment profile during periods of rain and are consistent with untreated sewage being diverted to and/or spilled from the storm tanks at the site. WASP believes there were at least 200 hours of spills of untreated sewage during the latter half of Jan 2021 and early Feb 2021. Severn Trent Water claimed the EDM monitor, which was not

installed until 1/4/2020 and faulty for the rest of 2020, was again faulty in 2021 and not fixed until November 2021. Severn Trent's submission of just 8 hours of spilling should be considered very unreliable.

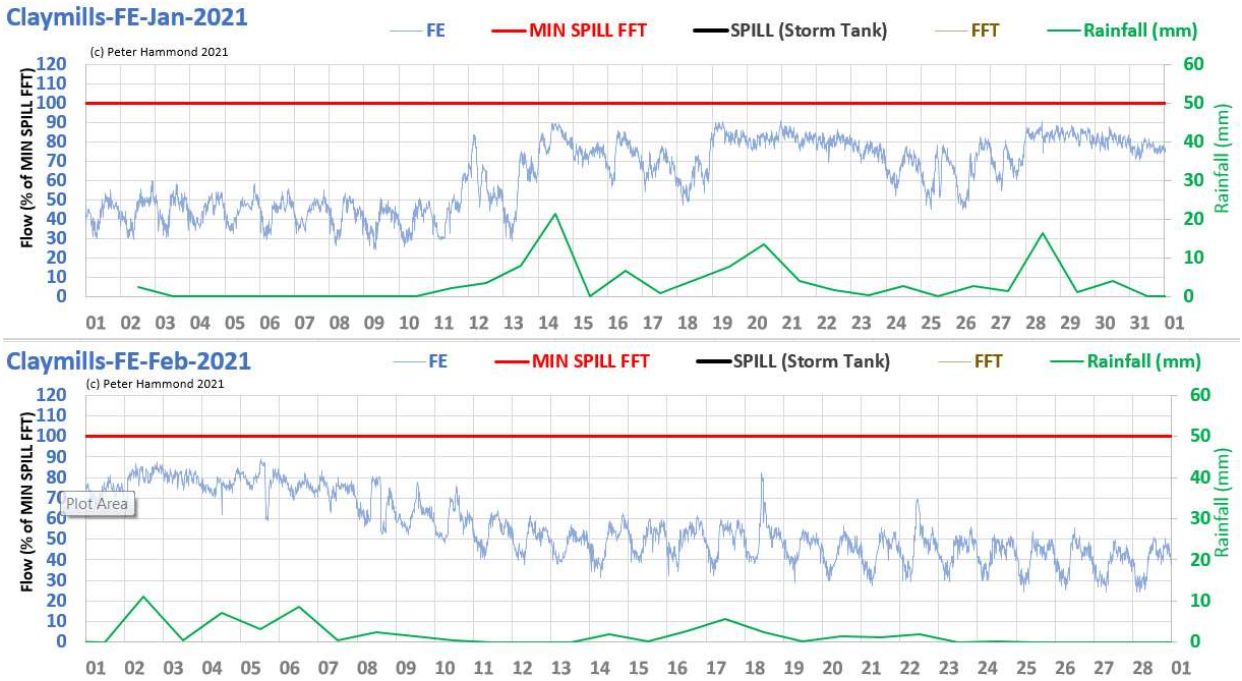


Figure 3: WASP believes that Claymills STW spilled untreated sewage on at least 10 days between Jan 18 and Feb 4

2020

Initially, SvT failed to provide the 2020 EDM spill data requested and needed a reminder. But, when the EDM data finally arrived it was clear that the spill start/stop times did not match the sewage treatment or rainfall data in any shape or form. They did correspond to the total of 4,773 spilling hours which SvT supplied to the EA in its 2020 EDM return. Quite clearly, the flow data does not correspond to 7 months of almost continuous spilling (**Fig**. 4) in that it is not demonstrating the usual flattened effect of spilling even for short periods. Perhaps, Claymills STW never makes spills of untreated sewage. The account below contradicts this.

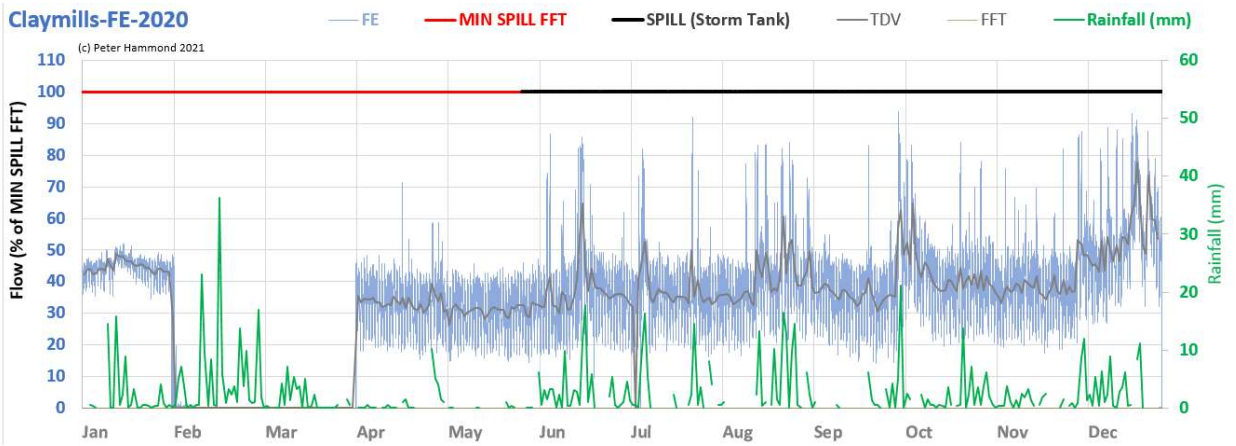


Figure 4: 15-min MCERTS effluent and total daily volume with rainfall and EDM spill data for 2020 at Claymills STW

More than 640 of the 2,000+ CSO entries in SvT's 2020 EDM submission to the EA have comments about technical problems and in particular for Claymills STW the entry is "*Maintenance issues have been identified at this site and maintenance tasks are scheduled to improve data quality for next year's return.*" Almost a third of the entries should be presumed unreliable.

It is highly likely, because of the adverse weather, that Claymills STW, like many thousands of STWs across England and Wales, spilled untreated sewage at the beginning and end of 2020. With the early data loss and the unreliable EDM data, neither the EA nor WASP will be able to check SvT's permit compliance with certainty. An alternative approach to using EDM data is to inspect telemetry messages between an STW and the control centre where a water company monitors the operation of each of its works and records activities such as storm tanks receiving sewage or being emptied. On September 1st 2021, WASP made an EIR request to SvT for all telemetry alarm messages between Claymills STW and its control centre. Despite multiple reminders, the telemetry alarm data have not been provided. Perhaps, SvT have something to hide. WASP certainly believes so as the following analysis suggests.

A closer inspection of the flow data for 2020 is quite revealing. Figure 5 shows the January 2020 effluent flow (blue curve) in comparison to the usual "dry" weather and regular diurnal flow of May 2020. WASP believes that the flatlining of the flow in January 2020 is related to spills of untreated sewage and as it occurs when the effluent flow is less than 50% of the storm overflow level it would have been in breach of permit.

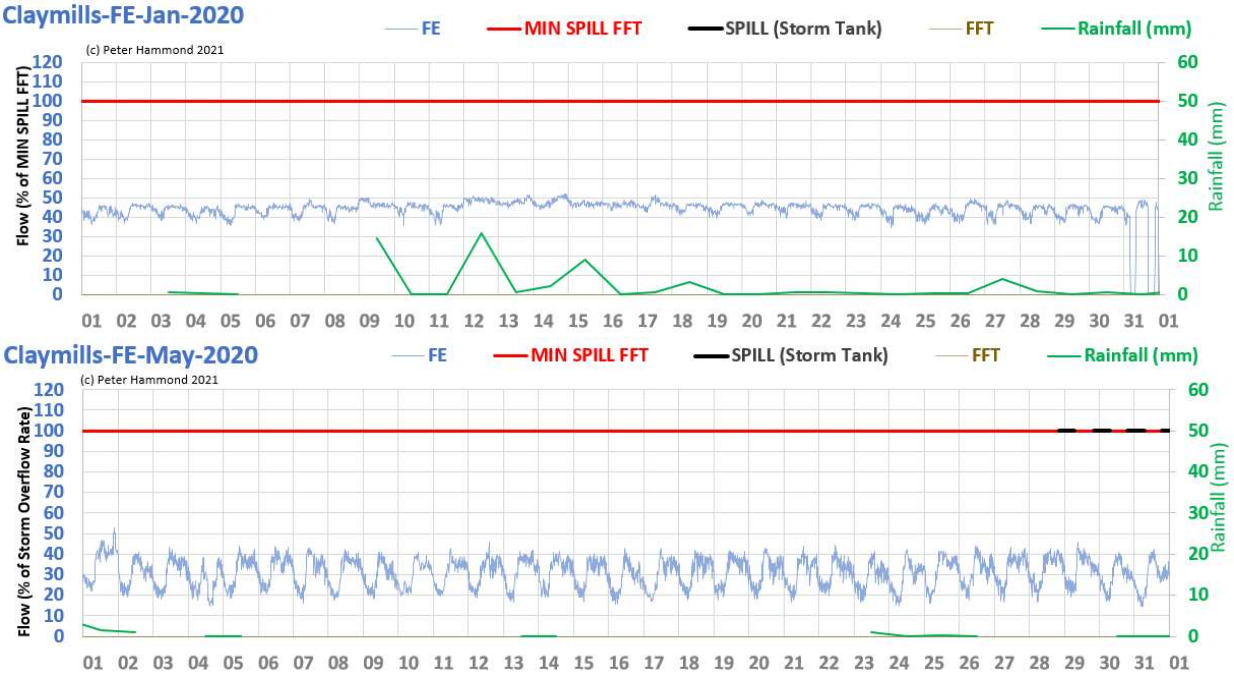


Figure 5: comparison of regular diurnal flow of May 2020 and flatlining in January 2020 likely related to sewage spilling

WASP believes there are **at least 6 "early" spilling days** in January 2020 at Claymills STW. It may be that SvT would point to equipment malfunction by referring to the telemetry data that it appears reluctant to provide.

2019

In 2019, there are extended periods of flatlining occurring when the effluent flow rate was below 50% of the storm overflow rate as illustrated in **Fig**. 6. Therefore, WASP believes that there were more than unpermitted "early" spills in October 2019 and November 2019.

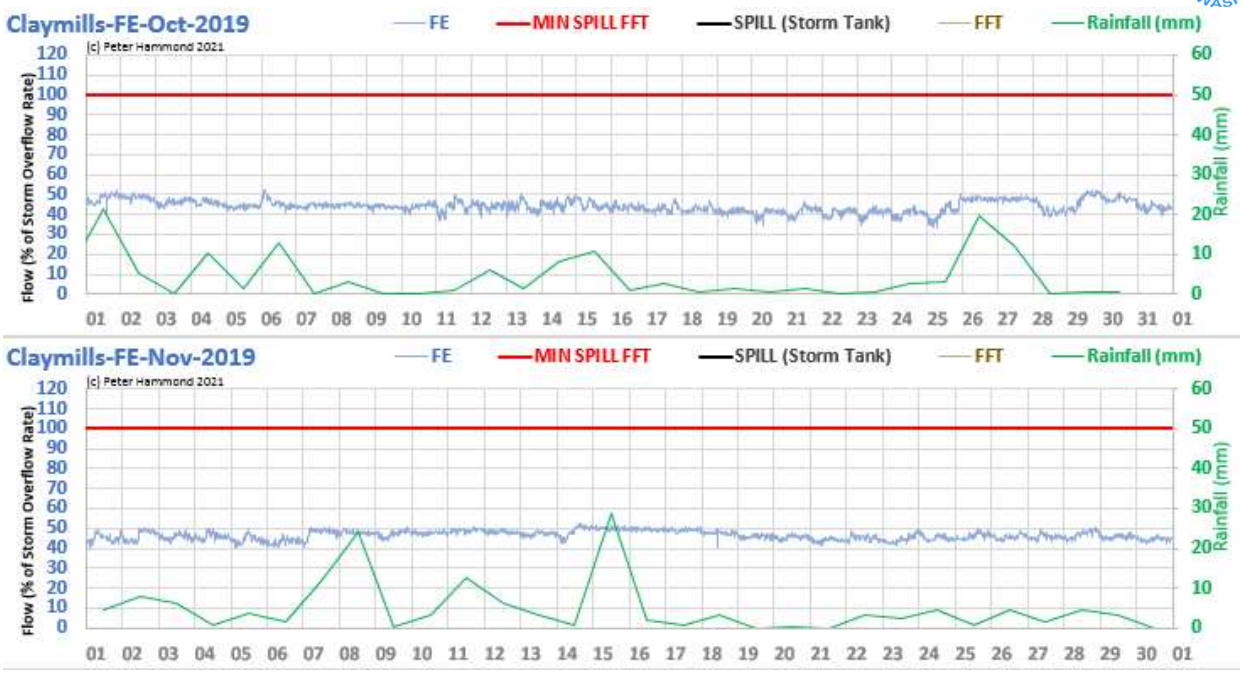


Figure 6: extended flatlining effluent flow below 50% of storm overflow rate suggesting "early" spills in autumn 2019

On August 16th 2019, an equipment failure occurred at Claymills STW that resulted in untreated sewage flooding a nearby museum (actually a former pumping station).

> *An equipment failure at the nearby Claymills treatment works, run by water and sewage firm Severn Trent, saw waste water flow into the Victorian industrial museum. … A spokesman from Severn Trent insisted the treatment wastewater posed no danger to the environment and was quickly cleaned up by the afternoon of Saturday, August 17. He said: "An equipment failure at our Claymills treatment works caused some flooding at the nearby museum on Friday night.* https://www.derbytelegraph.co.uk/burton/museum-flooding-burton-claymills-3226078

The loss of flow at Claymills STW can clearly be seen between 3 pm August 16th and 7 pm August 18th (**Fig**. 7). An estimate of **the volume lost is 1 billion litres** (or 1 million tonnes) and by comparison the storm tank can hold about 7,000tonnes before overflowing. How much of this lost sewage ended up spilled into the museum and how much into the River Trent is only known to SvT? Since there appears to have been a complete loss of treatment for 2 days this would be considered an unpermitted spill. It does not appear to have been reported to the EA as there is no mention of it in the EA records of "dry" and "early" spills for the period 2010 to 2020.

Figure 7: Claymills STW with no effluent flow (FE) leaving the works for 52 hours during August 16th-18th

2018

As in 2019, there are periods of flatlining effluent flow well below 50% of the storm overflow rate where WASP believes there may have been unpermitted "early" spills (**Fig**. 8).

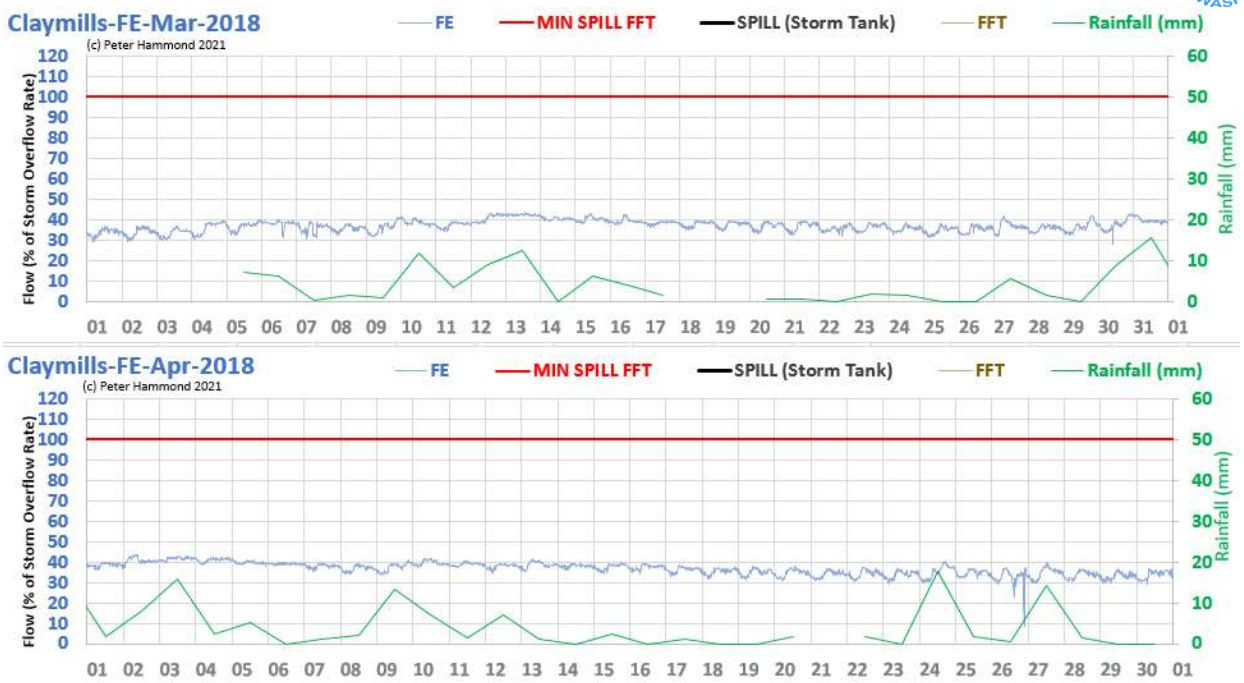


Figure 8: examples of flatlining effluent flow when it is below 50% of the storm overflow rate suggesting "early" spills

Hodsock STW – SEVERN TRENT WATER (SvT)

Hodsock STW spills to the Langold Stream and serves a population equivalent of about 8,706. The EDM device was not installed until 2020 so there is no EDM spill data available for 2018 and 2019. Hoever, WASP has estimated the amount of spilling using the EDM detected spills and flow patterns of subsequent years.

	EDM SUBMISSION TO EA				
year	hours	spills	active	comments	WASP beliefs/facts
2018					~840 spilling hours
2019					~1,776 spilling hours
2020	6,599	276	99.99%	Maintenance issues have been identified at this site and maintenance tasks are scheduled to improve data quality for next year's return.	~984 spilling hours
2021	72	22	67.5%	Sensor failure / issue Resolved - March Not asset maintenance - hydraulic capacity	~1,598 spilling hours

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Table 1: Annual spill hours for 2020 and 2021 submitted to EA by Severn Trent Water
WASP estimates for 2018 and 2019 for Hodsock STW

WASP believes, and the detailed evidence is provided below, that SvT's submittion to the EA was 6,599 spilling hours for 2020 when it is more like 984 and 72 spilling hours for 2021 when it is more like 1,600.

2018 and 2019

Using the detailed sewage treatment flow and rainfall data, WASP has estimated the total spilling hours to be about 840 hrs and 1,776 hrs respectively for 2018 and 2019. The areas of flattening of the sewage treatment curve representing the flow passed on to treatment process (FFT) are where spills are likely to have occurred. These estimates are meant to inform comparison with 2020 and 2021 and cannot be relied on.

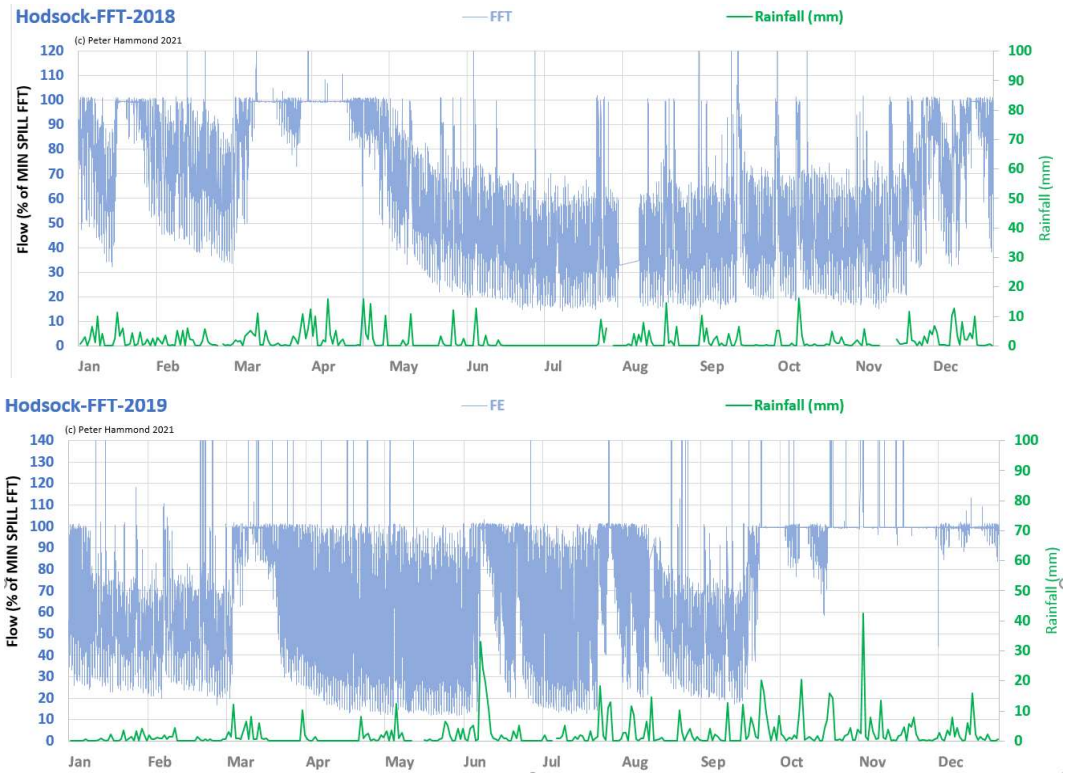


Figure 1: Detailed flow and rainfall data for Hodsock STW for 2018 and 2019
note the likely long spills in Spring 2018 and Autumn 2019 during periods of persistent rainfall

2020

The 2020 figure of 6,599 spilling hours at Hodsock STW submitted by SvT to the EA is unreliable given the inconsistency between detailed EDM data (purple horizontal segments in **Fig. 1**) and detailed flow to treatment (FFT) data provided to WASP by SvT (**Fig**. 2). WASP estimates the annual spilling total for 2020 to be much smaller than the submitted figure at about 984 hours (black horizontal segments in chart). SvT's comment added to its 2020 EDM submission to the EA suggests that a problem had been noticed with the monitor and an effort was to be made to fix it and improve the accuracy of the EDM data generated in 2021. This sensor failure was reported as being resolved in March 2021, some fifteen months after the EDM device was installed.

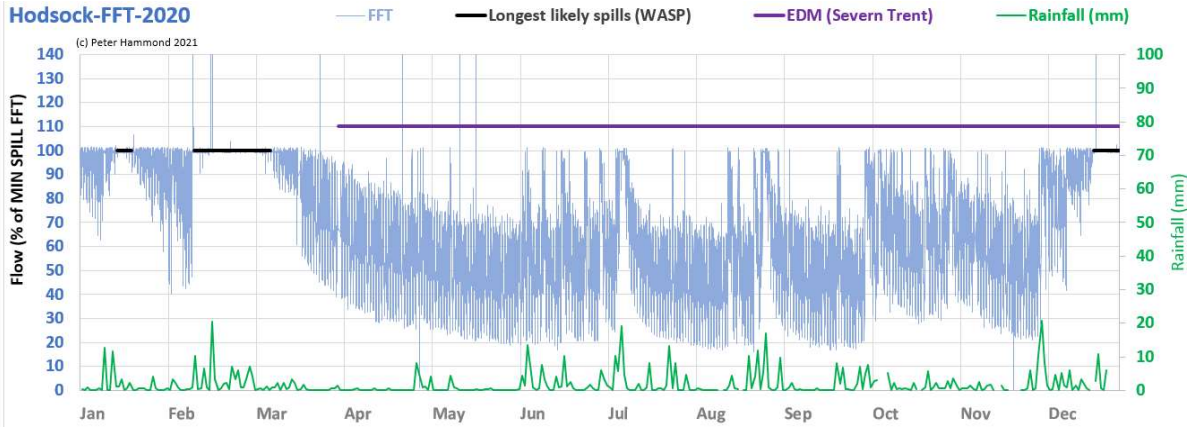


Figure 2: detailed EDM and detailed sewage treatment data for 2020 for Hodsock STW notice that SvT's EDM records omit two likely spill series in Jan and Feb-Mar 2020

2021

SvT 's summary EDM data submission to the EA for 2021 was for 72 spilling hours only, reporting that the sensor failure that was fixed in March (purple horizontal segments in **Fig**. 3). However, the detailed EDM data provided to WASP by SvT includes a long spill in January - March and another in late December (black horizontal segments in Fig. 2) that are consistent with the detailed sewage treatment and daily rainfall data. WASP believes the spilling total for 2021 should be more like 1,598 hours.

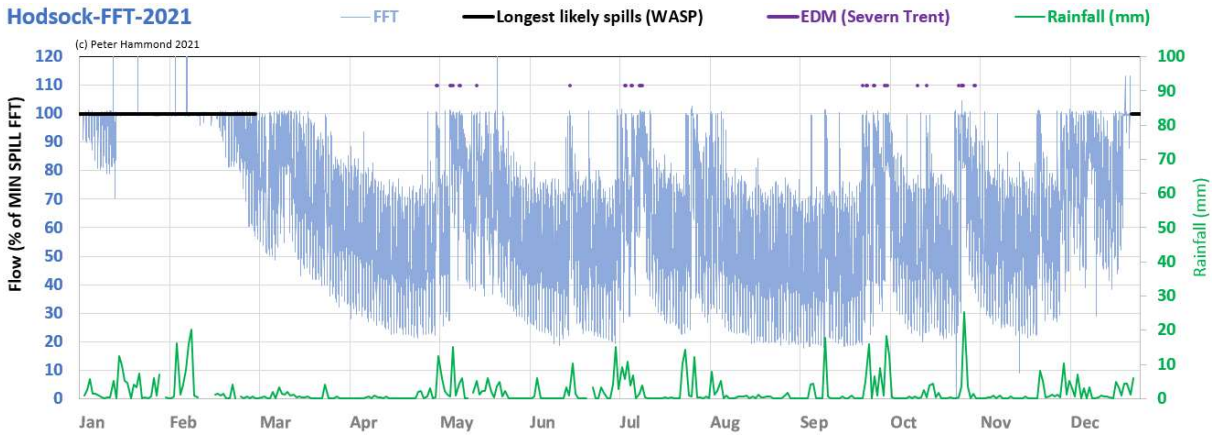


Figure 3: detailed EDM and detailed sewage treatment data for 2021 for Hodsock STW notice that SvT EDM records omit two likely spills in Jan-Mar and Dec 2021

WASP believes that SvT have used the "Sensor failure" excuse that was "Resolved in March" as a convenient reason for discounting the long spill in Jan-Mar.

Lydney STW - SEVERN TRENT WATER (SvT)

WASP submitted an EIR request for data for Lydney STW on 2nd February 2022. SvT refused the request on 3rd March 2022 citing the EA investigations into water companies.

Tewkesbury STW – SEVERN TRENT WATER (SvT)

EDM SUBMISSION TO EA					WASP beliefs/facts
year	hours	spills	active	Comments by SvT	
2018					
2019	1,100	69	99.87%		At least 12 illegal spilling days
2020	1,137	56	98.68%	For a proportion of the submission period this monitor has been reporting at a lower than required timestep which affects the data provided. Process improvements have been put in place to resolve this issue for next year's submission.	At least 13 illegal spilling days
2021	883.9	51	43.93%	Sensor failure / issue – Resolved - September	

Table 1: Annual spill hours for 2020 and 2021 submitted to EA by Severn Trent Water for Tewkesbury STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

According to the EA data provided to WASP, Tewkesbury STW serves a population of 19,070 but the EU WWTD database suggests that the figure is closer to 30,000 (**Table** 2) and that it is working at full capacity. It discharges to the River Avon just before the confluence with the River Severn.

2020

SvT's EDM return to the EA for 2020 agrees with the data provided to WASP of 1,1137 spilling hours over 57 spilling days of which WASP believes **11 involved "early" spills**. Figure 1 illustrates eight early spilling days in March 2020 at Tewkesbury STW of which **2 are also "dry"** with no rainfall on the day or day before.

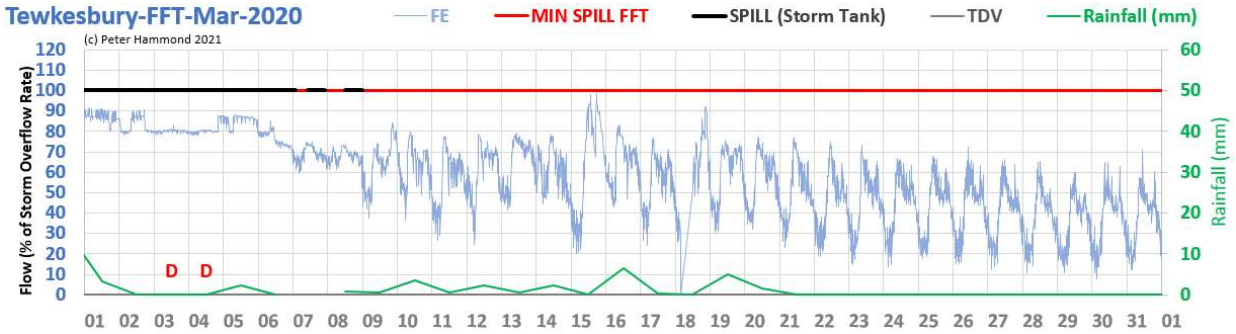


Figure 1: example of eight consecutive early spilling days in March 2020

2019

The EDM spill data provided to WASP by SvT for 2020 was as a result of appealing for individual spill start/stop times. For 2019, the spill data provided appears to be block spill start/stop times but at 1,180 spilling hours it is very close to the EA return of 1,100 spilling hours which is supposed to be calculated pre spill blocking. In any case, where the flow to full treatment is below the 92% (100% less allowed meter error of 8%) for a complete spilling day there must have been an "early" spill. From that point of view, WASP believes there were **10 "early" and 2 "dry" spilling days** in 2019 (**Fig**. 2).

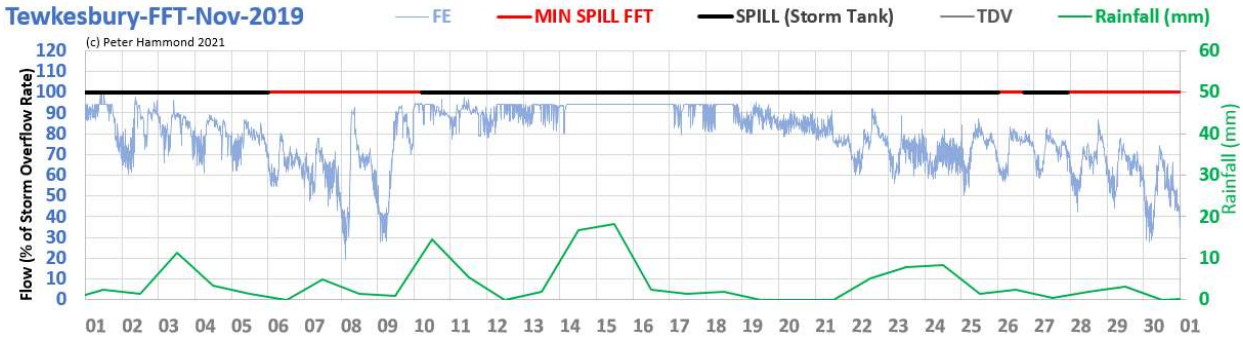


Figure 2: WASP believes there were 7 illegal spilling days in November 2019 (Nov 4th, 5th, 23rd, 24th, 25th, 26th, 27th**)**

Upton-on-Severn STW – SEVERN TRENT WATER (SvT)

EDM SUBMISSION TO EA					WASP beliefs/facts
year	hours	spills	active	Comments by SvT	
2018					estimated 1,400 spilling hours at least 2 illegal spilling days
2019					estimated 2,400 spilling hours at least 6 illegal spilling days
2020	406.5	21	100.00%		additional 1,200 spilling hours before EDM operational at least 6 illegal spilling days
2021	1,407.2	64	94.24%		

Table 1: Annual spill hours for 2020 and 2021 submitted to EA by Severn Trent Water
WASP estimates for 2018 and 2019 for Hodsock STW

Upton-on-Severn STW is a small works serving a population equivalent of about 2,900 with a loading over the past 10 years of between 76.3% and 86.2% according to the EU WWTD database. It spills directly into the River Severn and its storm tank capacity (149 m^3) is about half the value it should be (288 m^3) if the EA requirement of a capacity large enough to hold 2 hours' worth of sewage at the storm overflow rate is applied. A storm tank of the correct required size would reduce the frequency and volume of untreated sewage spilled.

The "active" column in Table 1 corresponds to the entry in the submission to the EA clearly labelled as

Operation - % of reporting period EDM operational

WASP interprets "reporting period" relative to EDM operation as the entire calendar year prior to the year when submissions are reported. Severn Trent appears to interpret this as

*Operation - % of **installed** period EDM operational*.

Hence, WASP believes that the 100% figure for EDM activity submitted to the EA to be unreliable.

The sewage treatment data provided to WASP for Upton-on-Severn STW is for final effluent (FE) and on occasion its rate is between 50% and 60% of the storm overflow level when WASP believes, conservatively, that such spills at such a small, straightforward STW are "early" and hence illegal.

2020

The 2020 overview chart for Upton-on-Severn STW

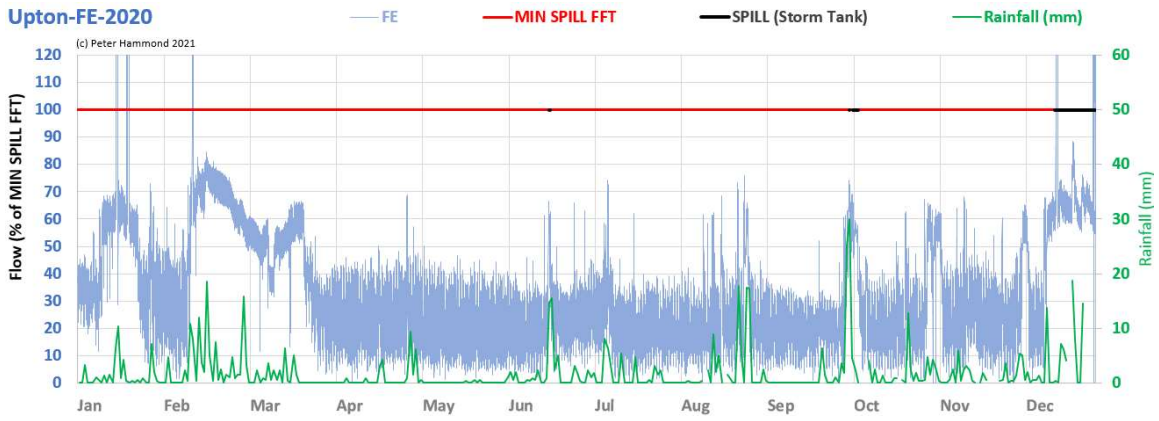


Figure 1: Overview chart for Upton-on-Severn STW for 2020 suggesting intensive spilling in Jan-March

"early" spilling examples detected by the EDM monitor are shown in **Fig**. 2 below.

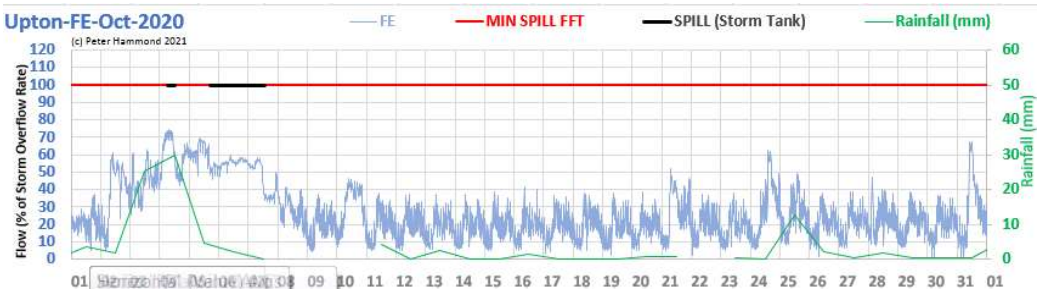


Figure 2: WASP believes the spills on Oct 5th & 7th with final effluent at 50-60% of storm overflow rate were "early"

Other detected spills included in the 2020 submission, have a flattened envelope (**Fig**. 3).

Figure 3: spills confirmed by EDM between Dec 17th and Dec 31st 2020

These suggest that there were other spills earlier in the year in February and March (**Fig**. 3), presumably before the EDM monitor was commissioned and so not included in SvT's submission to the EA. WASP believes these three months would account for a further 1,000 spilling hours. In WASP's interpretation of EDM activity, either the operational figure is less than 50% or otherwise many spills went undetected.

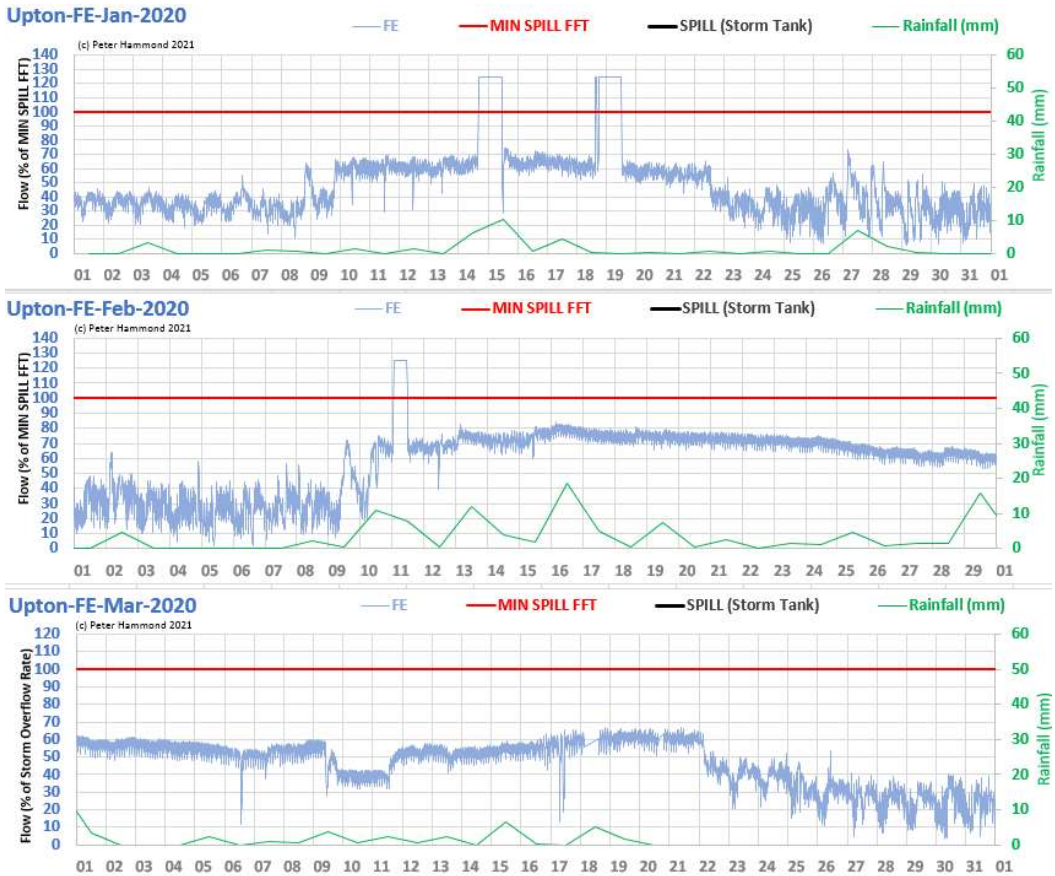


Figure 4: WASP believes there were long spills Jan-Mar 2020 totalling an additional 1,200 spilling hours

2019

The 2019 overview chart (**Fig. 5**) suggests, WASP believes, that there were long periods of spilling throughout the year amounting to as much as 2,400 spilling hours.

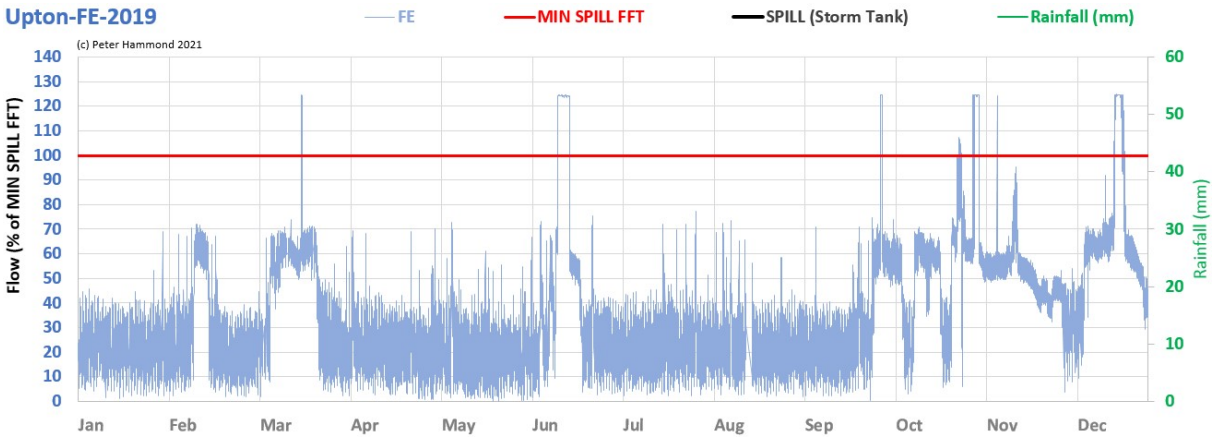


Figure 5: WASP believes this overview chart for 2019 for Upton-on-Severn STW suggests over 2,400 spilling hours

The monthly charts for Oct-Dec 2020, WASP believes, are consistent with 70 days of spilling or over 1,600 spilling hours, of which at least 6 spilling days WASP believes to be illegal.

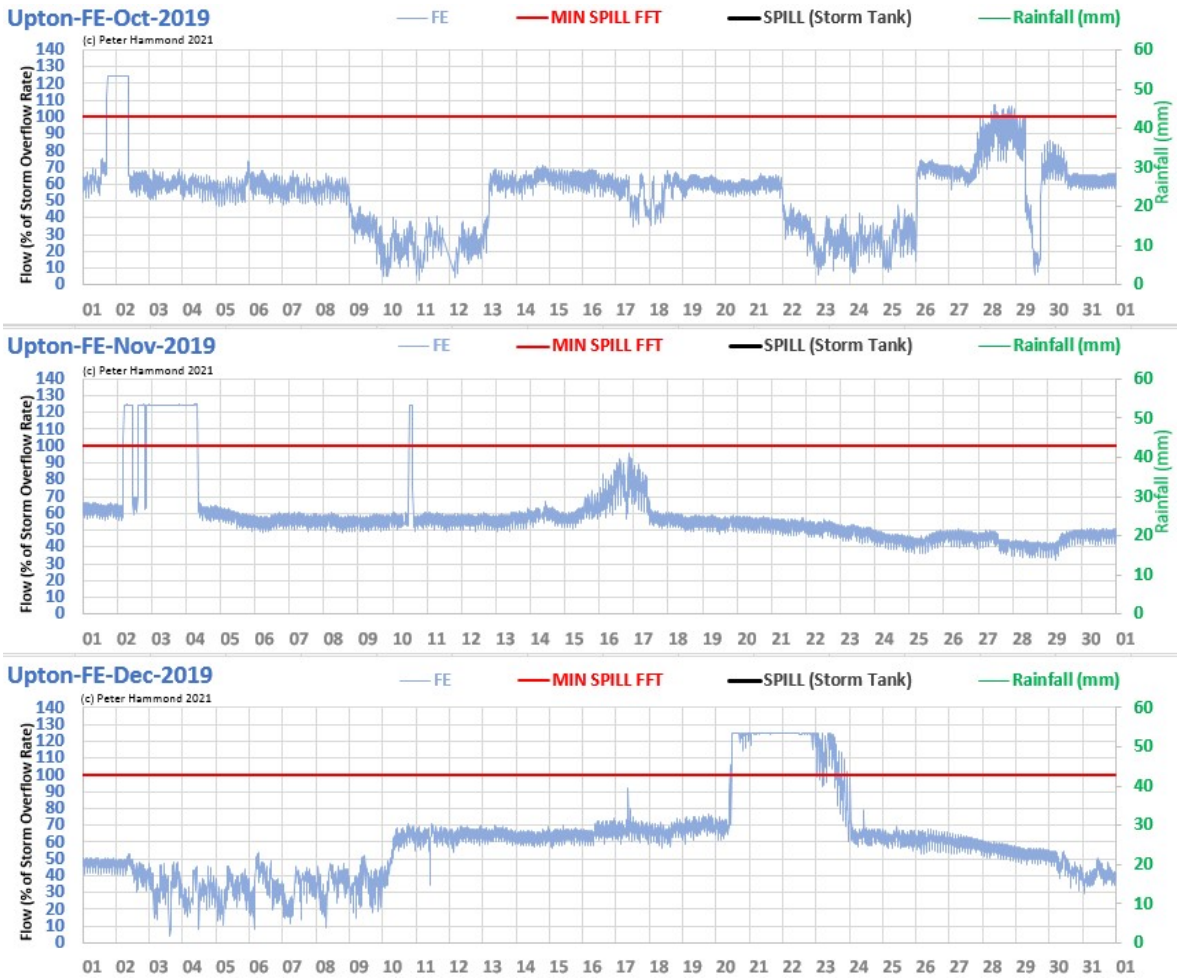


Figure 6: WASP believes there were more than 1,600 spilling hours between Oct and Dec 2020

2018

WASP believes an analysis of 2018, similar to that of 2019, suggests that there were over 1,400 spilling hours at Upton-on-Severn STW (**Fig**. 7).

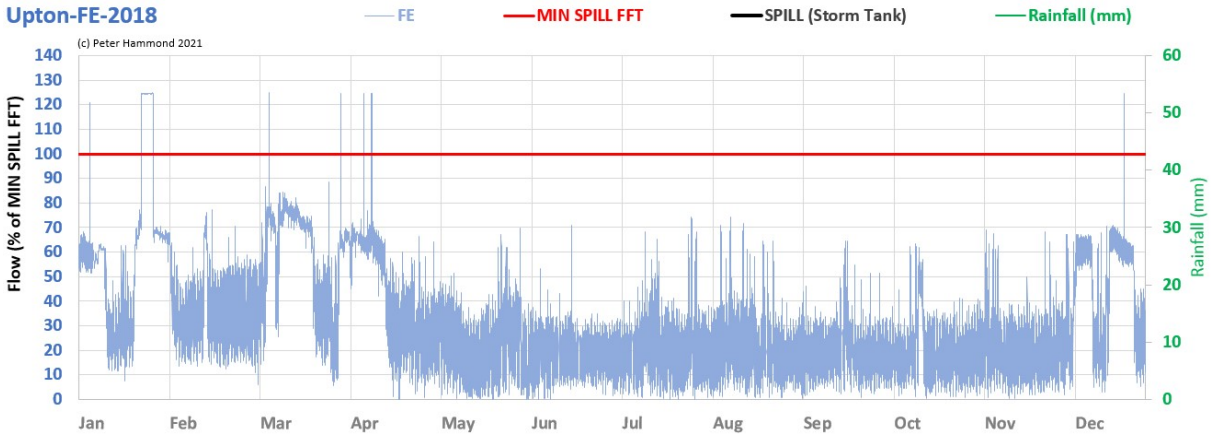


Figure 7: WASP believes there were more than 1,400 spilling hours in 2018

SOUTHERN WATER

Bexhill-Hastings STW – SOUTHERN WATER (SW)

EDM SUBMISSION TO EA					WASP beliefs/facts
year	hours	spills	active	comments	
2018	1,103	120			12 illegal spilling days
2019	808	88	100.00%		8 illegal spilling days
2020	1,280	117	94.00%		16 illegal spilling days
2021	~~1,258~~	~~125~~	100.00%		

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Table 1: EDM submissions to EA by Southern Water for Bexhill-Hastings STW

Bexhill-Hastings STW serves a population of about 140,000 and was substantially upgraded in 2003. It discharges through twin long sea outfalls at Bulverhythe and Combe Haven which are situated 3.5 kilometres (km) offshore to the west of the bathing area. In 2021, 13 pollution risk warnings were issued for bathing[14]. In 2022, there have been several sewage spilling incidents causing beaches to be closed for swimming[15,16]. Bexhill-Hastings STW has no storm tank but has had an inlet overflow since 2014.

Historical spill data 2009-2017

From historical data provided to WASP by SW, it appears that from 2009 to 2013 spills occurred when the treatment was above the works capacity/storm overflow rate of 922 l/s. From 2014 to 2015, spills typically occur when the treatment is almost precisely the works capacity. Spills occurring after 2016 start to include increasing numbers of spills when treatment is below the works capacity and hence illegal, even allowing for the 8% error permitted by the EA.

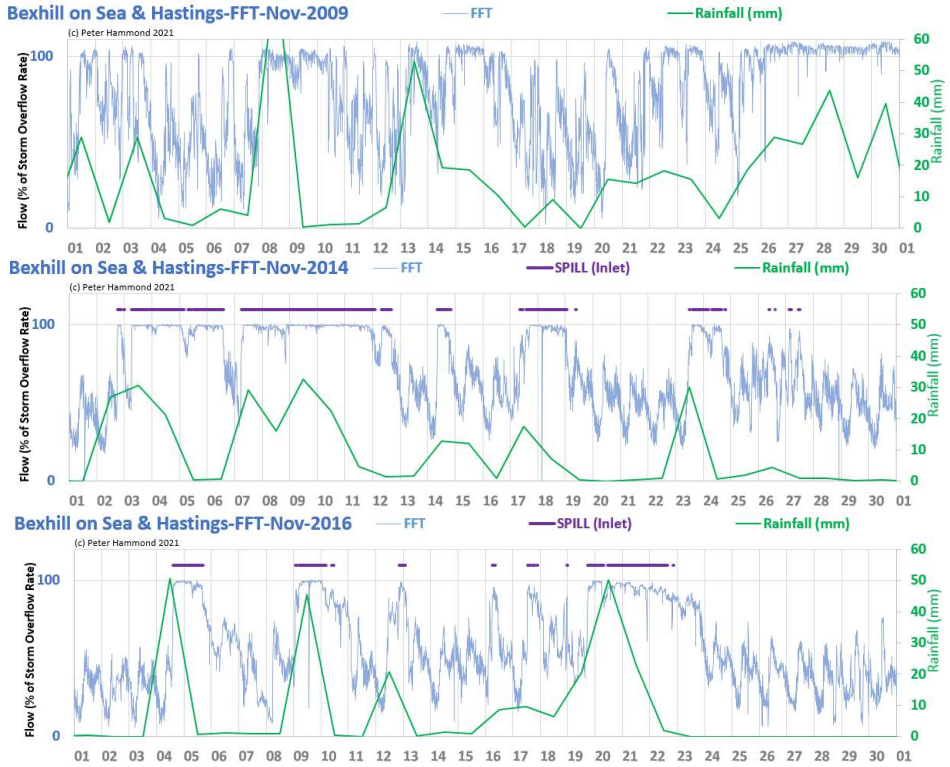


Figure 1: spilling at Bexhill-Hastings with treatment above (2009), at (2014) and below (2016) works capacity

[14] https://environment.data.gov.uk/data/bathing-water-profile/ukj2202-14150/2022:1

[15] https://www.sussexlive.co.uk/news/sussex-news/red-sewage-alert-issued-bexhill-7513042

[16] https://www.dailymail.co.uk/news/article-11129381/Bexhill-Normans-Bay-East-Sussex-shut-water-company-pumps-untreated-sewage-sea.html

2018

WASP believes there were 12 illegal spilling days at Bexhill-Hastings STW in 2018.

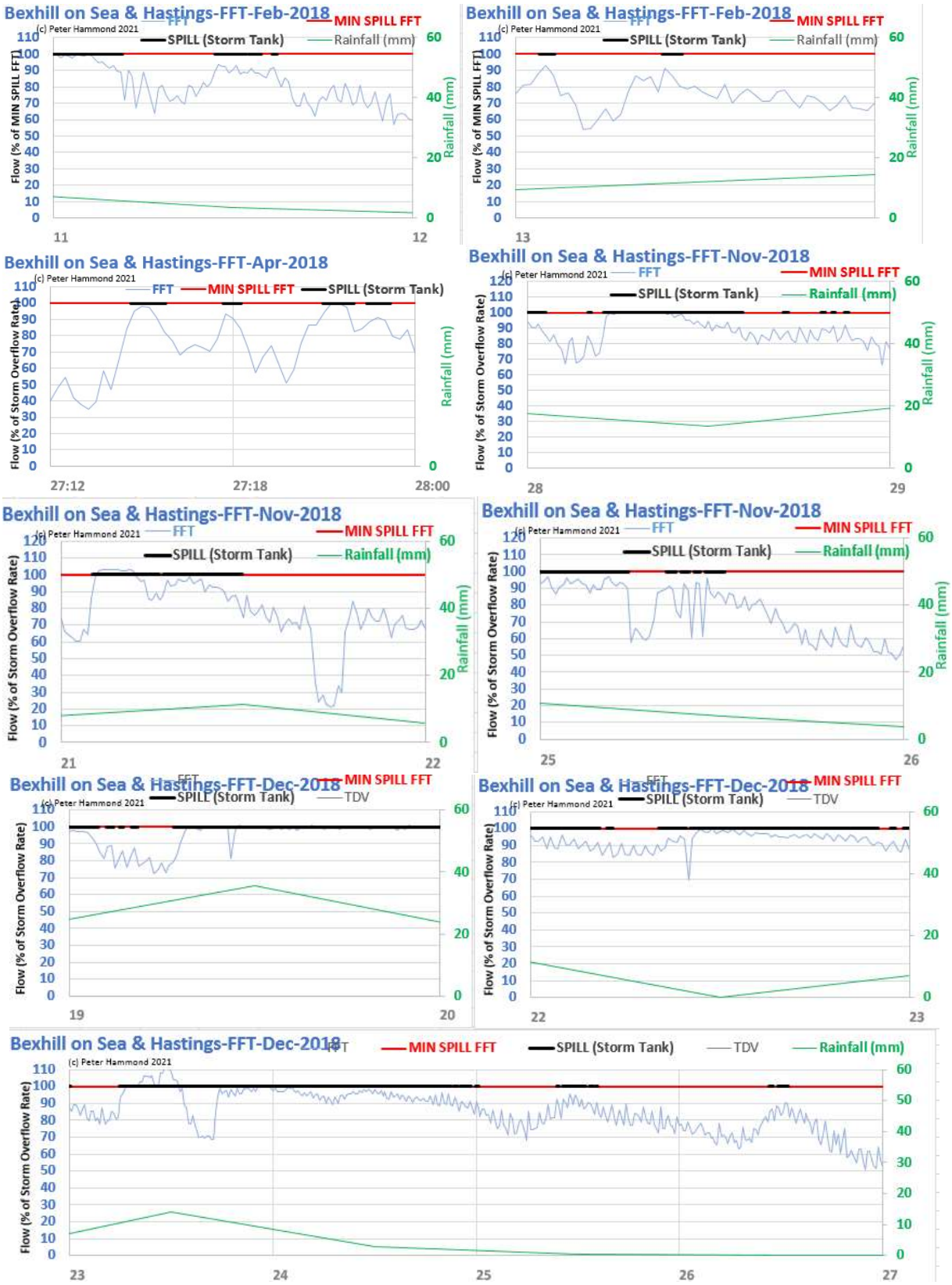


Figure 2: WASP believes there were 12 illegal spilling days at Bexhill-Hastings STW in 2018 (Feb 11,13; Apr 27; Nov 21,25,28; Dec 19,22-26)

2019

WASP believes there were 8 illegal spilling days at Bexhill-Hastings STW in 2019.

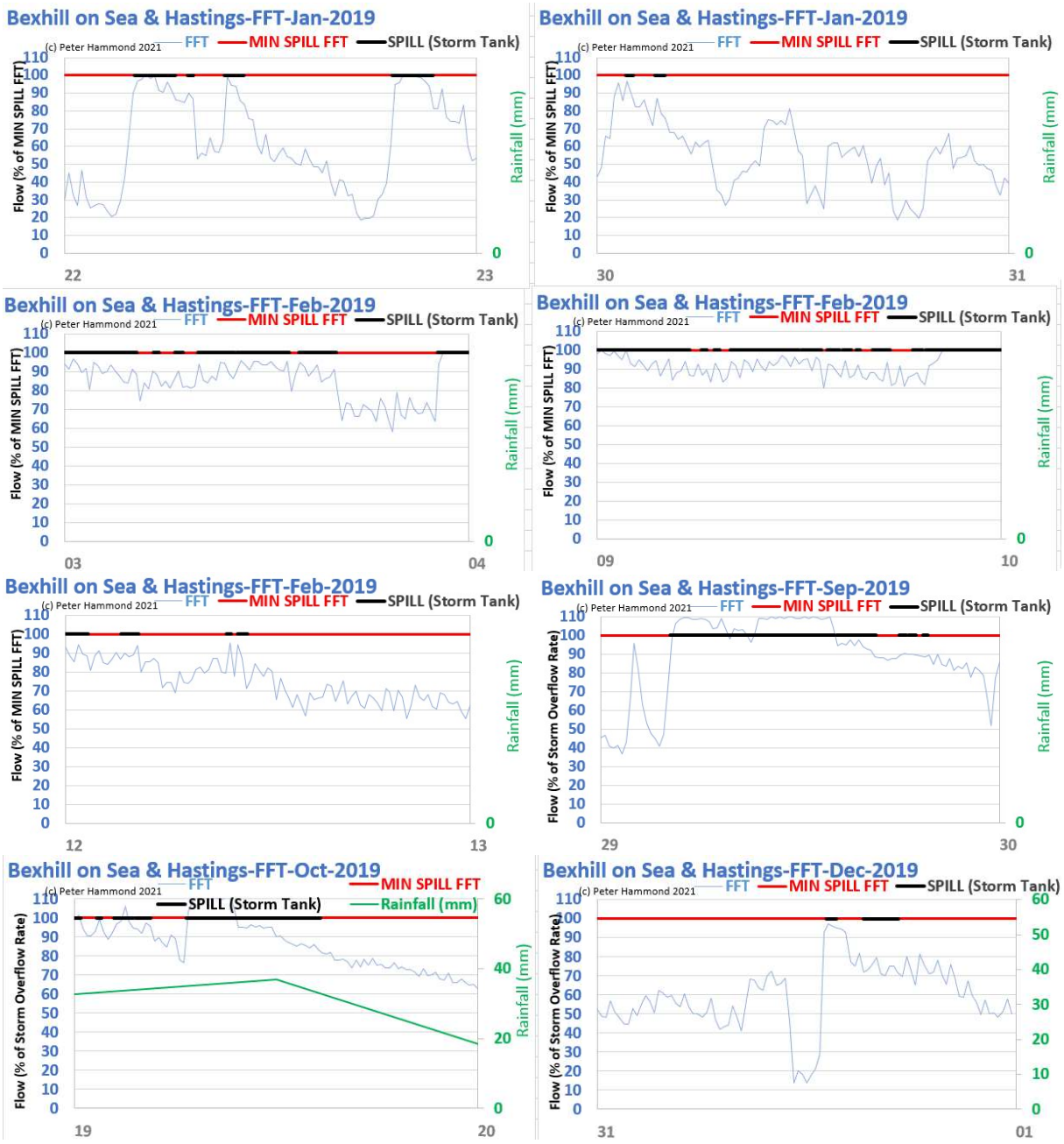


Figure 3: WASP believes there were 8 illegal spilling days at Bexhill-Hastings STW in 2019 (Jan 22,30; Feb 3,9,12; Sep 29; Oct 19; Dec 31)

2020

WASP believes there were 16 illegal spilling days at Bexhill-Hastings STW in 2020.

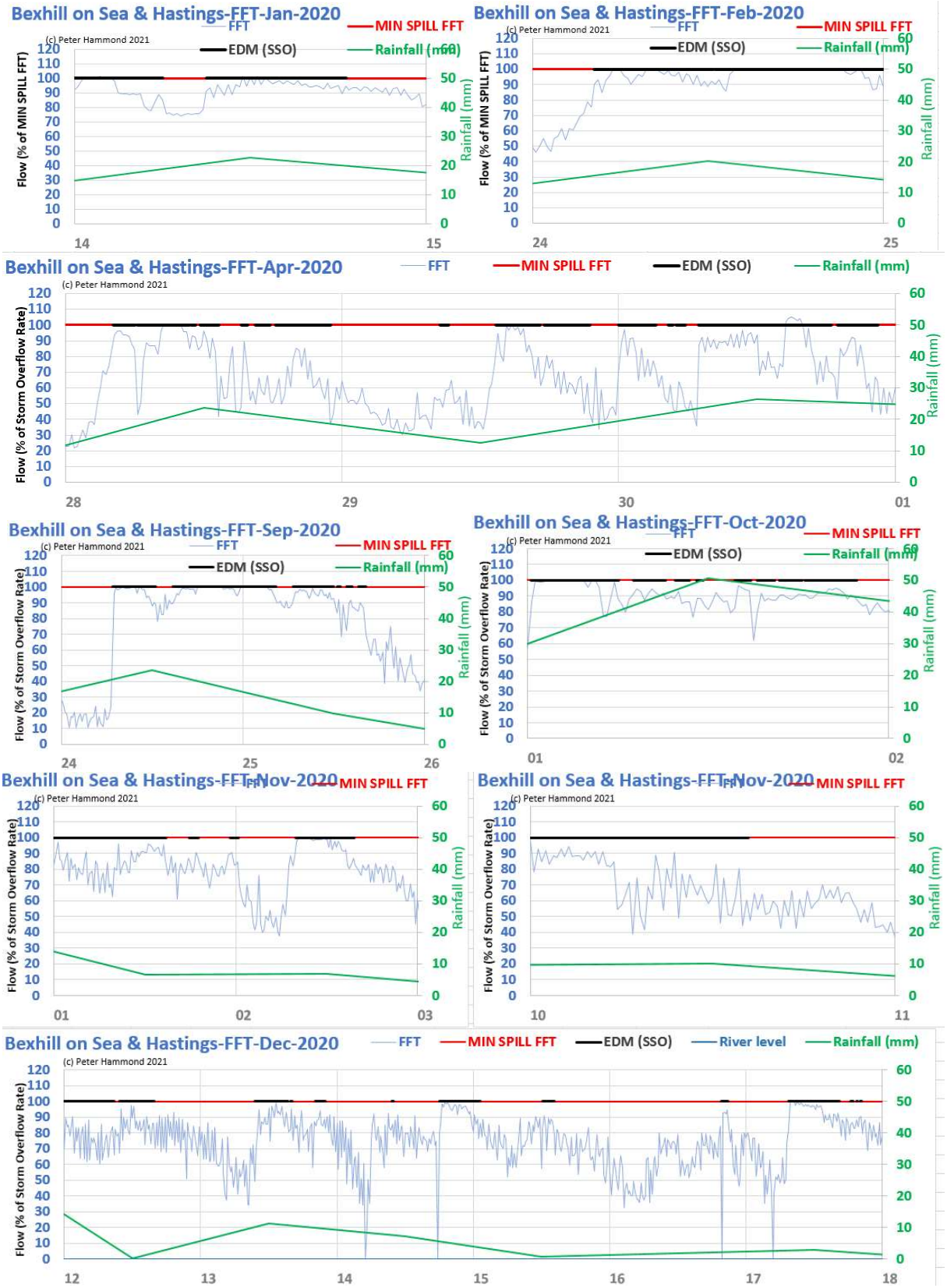


Figure 4: WASP believes there were 16 illegal spilling days at Bexhill-on-Sea STW in 2020

Lavant STW – SOUTHERN WATER (SW)

Lavant STW spills to the River Lavant, a chalkstream which flows into Chichester Harbour.

EDM SUBMISSION TO EA					WASP beliefs/facts
year	hours	spills	active	comments	
2018	4,574	196	100%		analysed in previous WASP report
2019	3,806	160	100%		analysed in previous WASP report
2020	244.73	11	100%		at least 4,000 spilling hours at least 78 illegal spilling days
2021	4,996	209	100%		at least 72 illegal spilling days

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Table 1: EDM submissions to EA by Southern Water

The apparent miracle reduction to spilling 245 hours at Lavant in 2020 after thousands of hours in the previous two years, as reported to the EA, is unfortunately not a true representation of the data. The detailed EDM spill data on Southern Water's website corresponds to 245 hours in December only. However, guided by treatment and EDM data for previous two, treatment data suggest at least 2,000 spilling hours in 2020.

A primary cause of the high flows into Lavant is the groundwater ingress through cracks and leaky joints in the sewer pipes feeding the works. A secondary reason is that its storm tank is only 168 cu m when the EA requisite minimum to hold 2 hrs at the full capacity inflow of sewage is 223 cu m. Fixing the leaks and enlarging the storm tank would eliminate a huge amount of spilling.

2018-2019

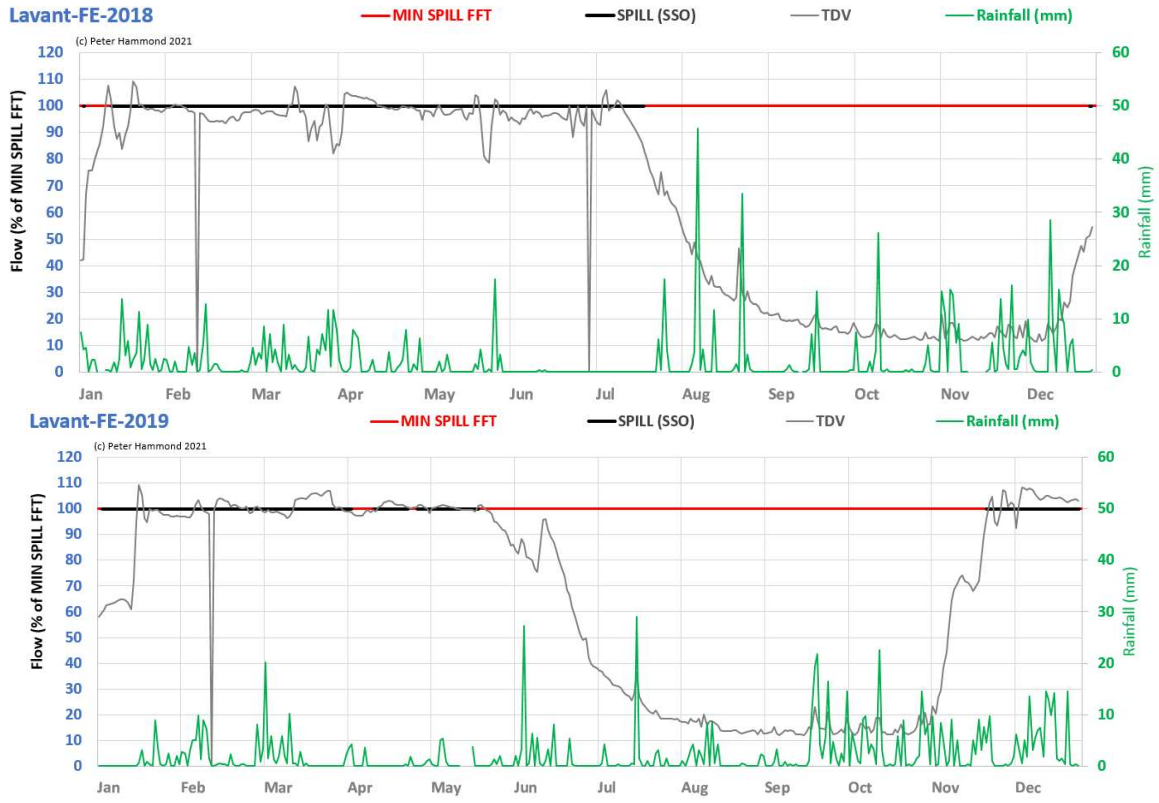


Figure 1: TDV and EDM detected spills for 2018 and 2019 for Lavant STW

2020-2021

Southern Water reported 245 spilling hours restricted to December. At first sight, this appears to be a remarkable reduction from the 3,805 and 4,574 spilling hours for 2019 and 2018. In fact, WASP believes there were many spills between January and May 2020 as the overview illustrates (**Fig**. 1), at least 4,000 hours' worth and including an estimated 78 illegal "dry" spilling days.

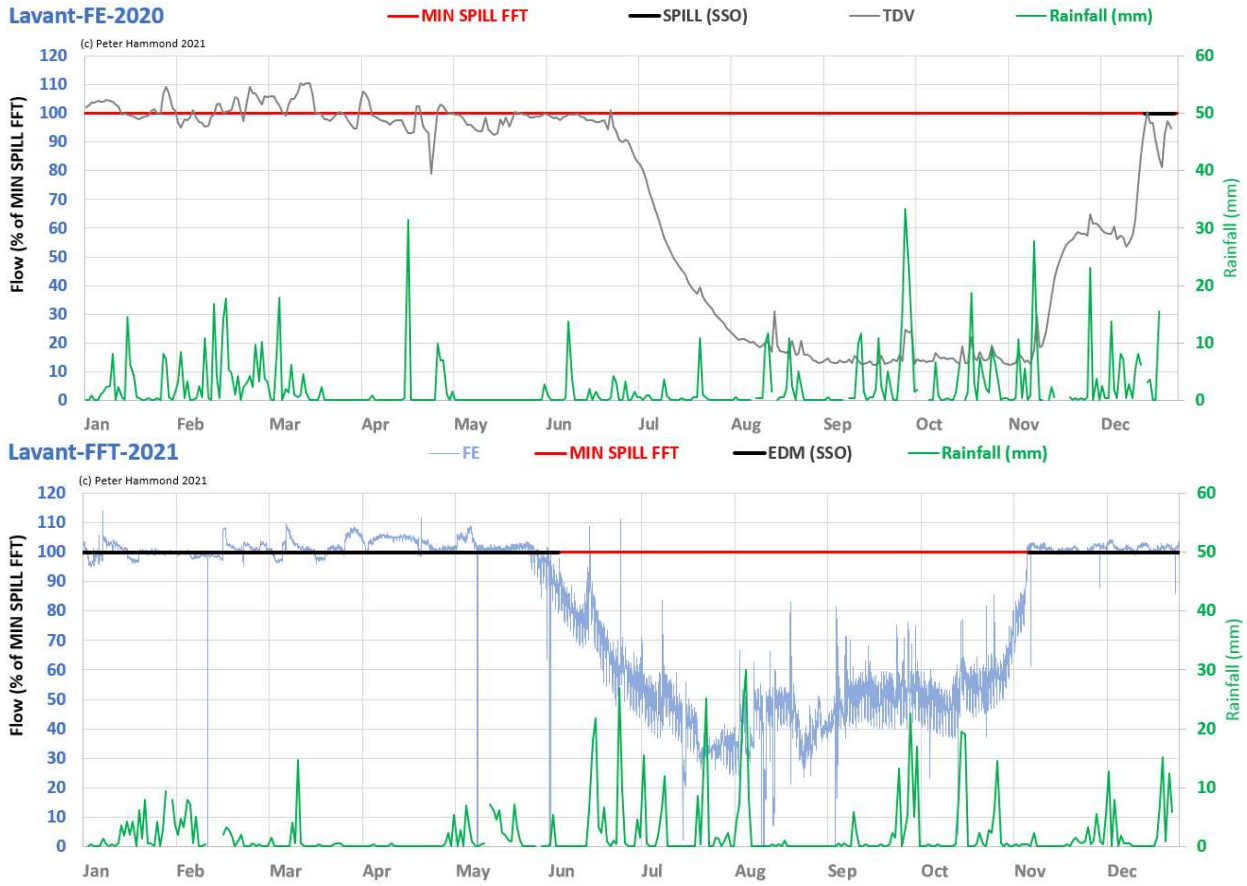


Figure 2: 2020 and 2021 annual overview charts for Lavant STW

Similarly, for 2021, the sewage treatment and detailed spill data obtained via an EIR request to SW are consistent with each other and the summary spill data SW submitted to the EA. WASP believes there were at least 72 illegal "dry" spilling days.

The yearly repeated pattern of a long series of almost unbroken spilling at Lavant STW between December one year and May/June the next is quite clear. Hence the submission to the EA of only 75 spilling hours in December 2020 with no apparent explanation is remarkable.

WASP believes there were at least 72 illegal dry spilling days at Lavant STW in 2021.

SOUTH WEST WATER (SWW)

Bere Alston STW – SOUTH WEST WATER (SWW)

year	EDM SUBMISSION TO EA hours	spills	active	comments	WASP beliefs/facts
2018	SSO:417 SO:305	SSO:20 SO:15	100% 100%		
2019	SSO:3,508 SO:2,111	SSO:201 SO:141	100% 100%	Flow control and storm separation this site needs investigating as it is possible that premature spills are occurring.	
2020	SSO:3,076 SO:3,026	SSO:171 SO:181	100% 100%	Following the SOAF policy the performance of this storm overflow will be investigated in 2022.	25 illegal spilling days
2021	SSO:2,958 SO:3,252	SSO:179 SO:174	100% 100%	U_IMP4 driver - Stage 4: Spill reduction scheme - On current WINEP/AMP7 or Green Recovery	16 illegal spilling days 74.5 M litres of sewage spilled

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Table 1: EDM submissions to EA by South West Water for Bere Alston STW

Bere Alston STW serves a population equivalent of 2,280 and discharges to the River Tamar via an inlet storm overflow and a storm tank overflow. When both overflows are in operation, the difference between the two weir settings 25.2 – 13.8, or 11.4 litres sec, will be discharged via the storm tank overflow outlet.

2018

The 2018 overview chart for Bere Alston STW (**Fig**. 1) suggests that the works continued to treat well above the 13.8 litres/sec capacity during wet periods in the first quarter. The flattened flow to full treatment from October to 2018 onwards suggests that storm discharges did not take place until October and were not recorded until December, presumably when the EDM devices were commissioned.

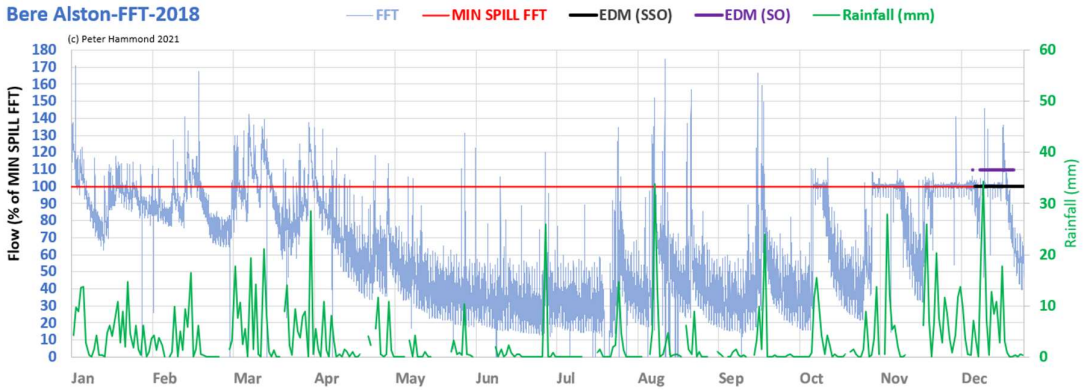


Figure 1: 2018 overview of sewage treatment, rainfall and spill data for Bere Alston STW

SWW provided WASP with block spill times for 2018 and total spilling of only 36 hours more than the summary spill data supplied to the EA. So, the Dec monthly chart (**Fig**. 2) suggests that either the detailed EDM data is unreliable or there were illegal early spills Dec 26-31 when there was over 100 spilling hours.

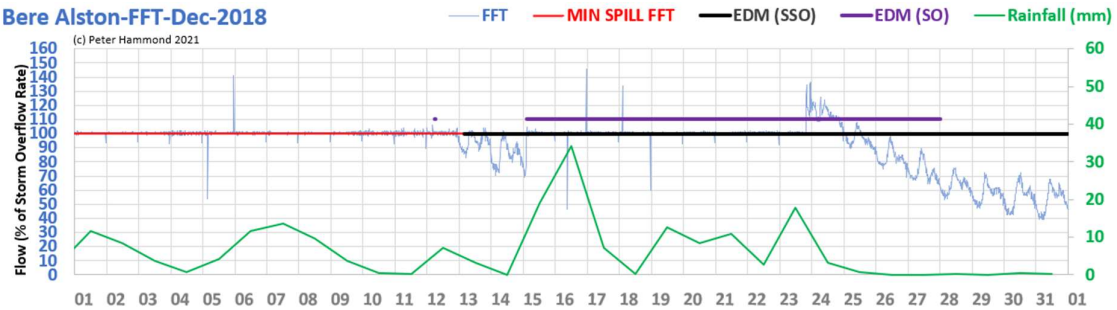


Figure 2: WASP believes that either the EDM device was faulty or there were illegal spills Dec 14, 26-30

2019

As with 2018, SWW did not provide individual spill start-stop times so it is not easy to provide detailed analysis of compliance with the discharge permit.

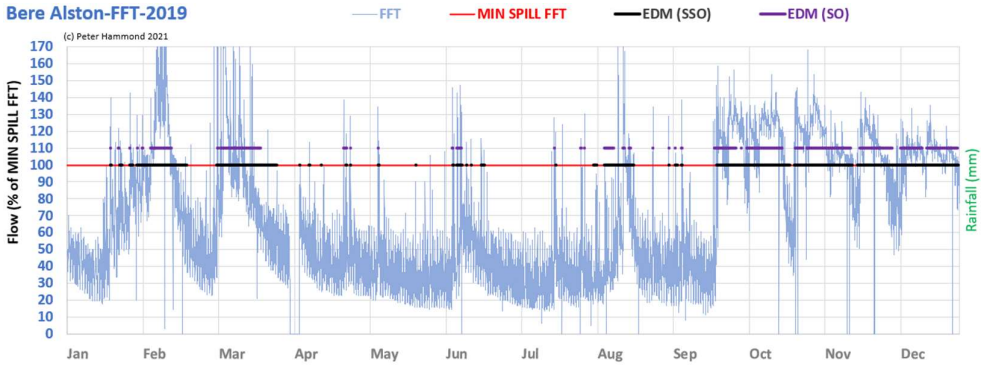


Figure 3: 2019 overview of sewage treatment and EDM spill blocks at Bere Alston STW

Once again, there appears to be treatment well above the capacity rate during EDM detected spill blocks.

2020

Through a follow-up EIR request, WASP was able to obtain individual spill start-stop times for Bere Alston STW for 2020 and 2021.

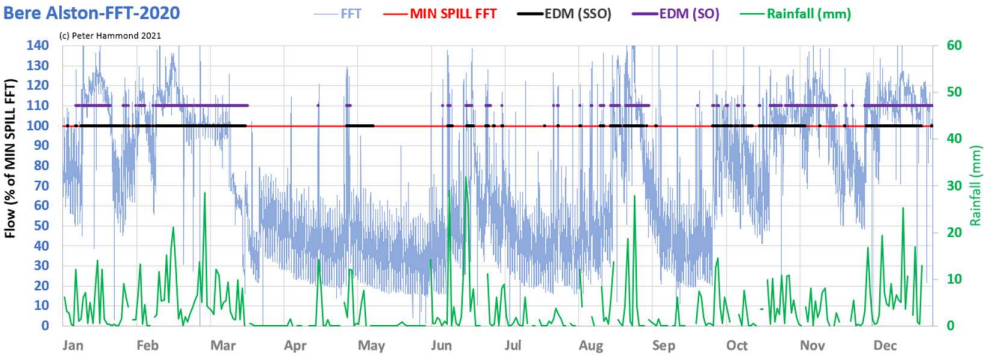


Figure 4: 2020 overview of sewage treatment, rainfall and spill data for Bere Alston STW

The 2020 overview chart for Bere Alston STW suggests a mixed operation of continuing treatment at higher than capacity levels during spills but also spill induced flattening of treatment flow as in Feb/March (**Fig**. 5).

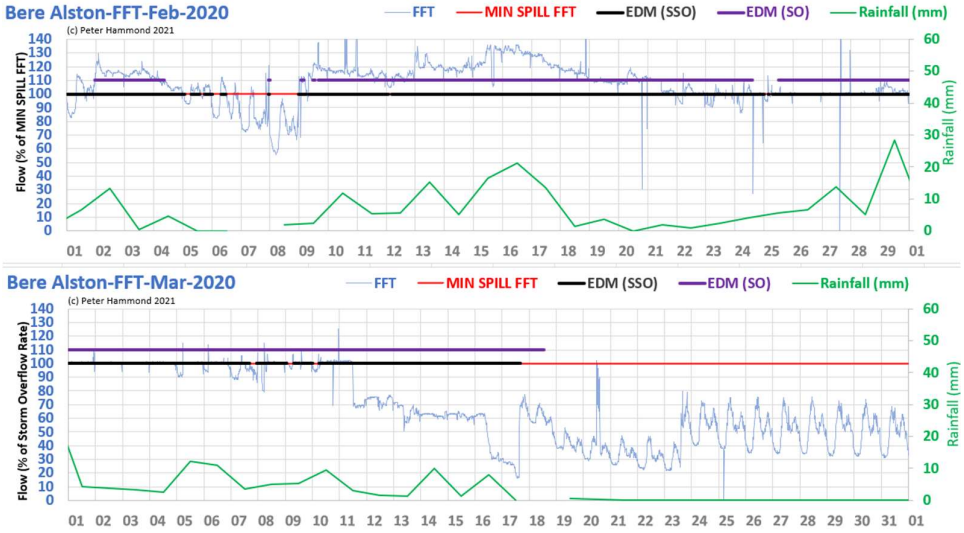


Figure 5: charts for Bere Alston STW showing treatment above storm overflow rate during spills in Feb but also 7 illegal spilling days (Mar 11-17)

WASP believes there were 7 illegal spilling days in March 2020 (**Fig**. 5) and a further 18 illegal spilling days later in the year (**Fig**. 6).

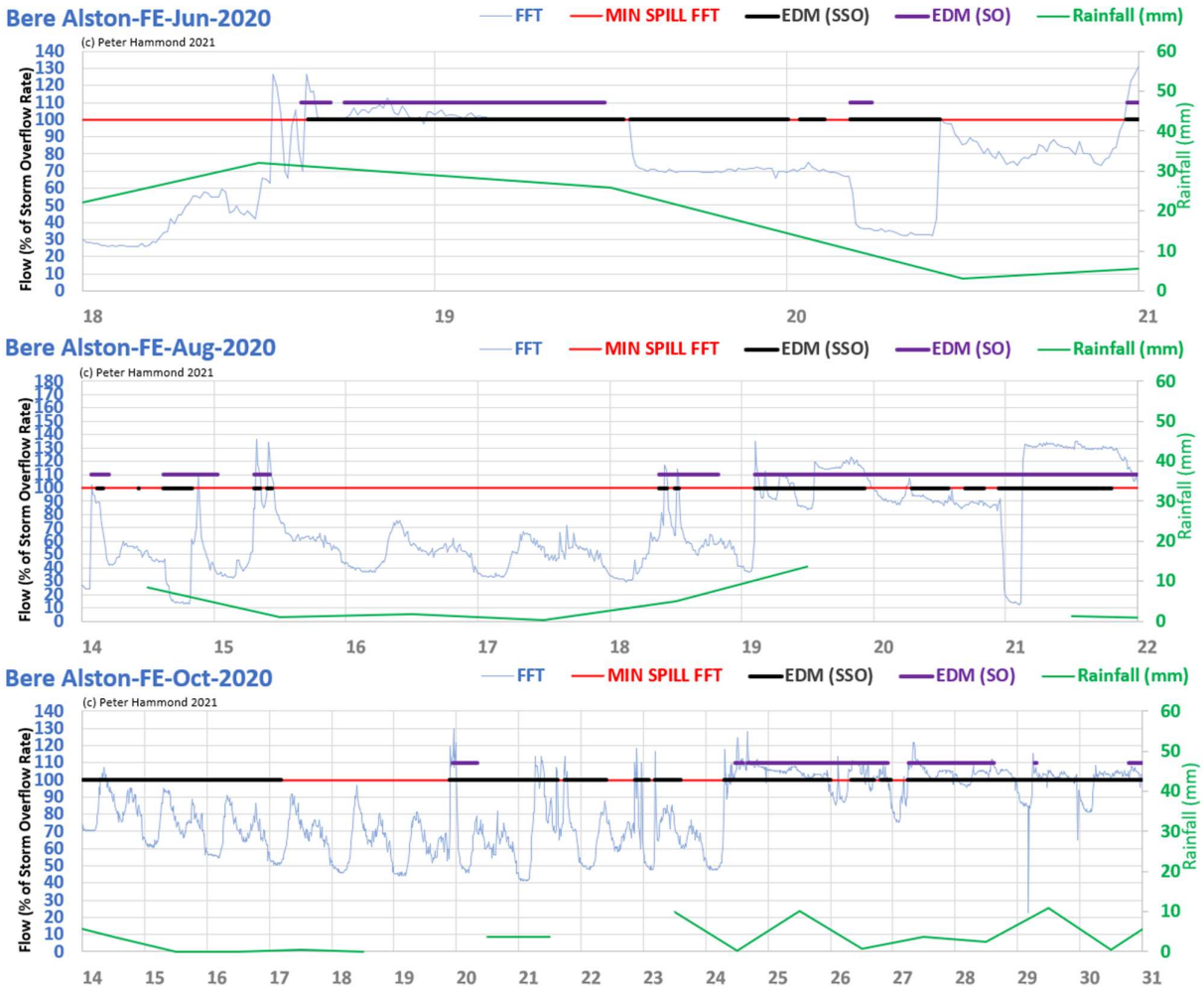
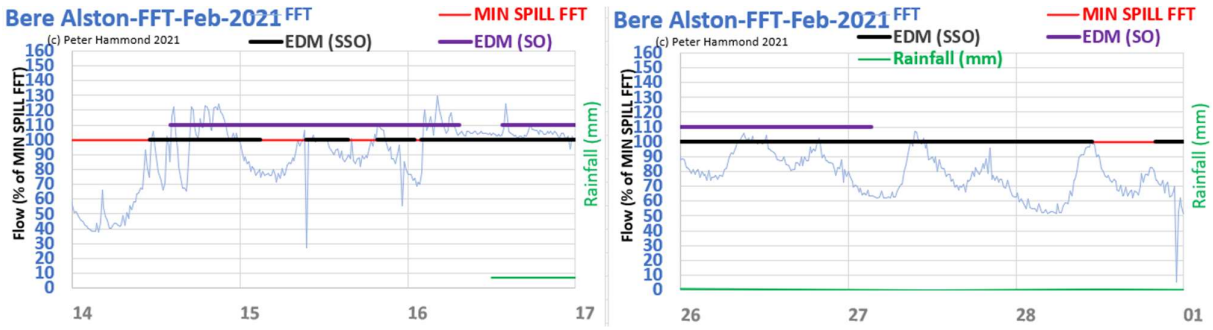


Figure 6: WASP believes there were 18 illegal spilling days at Bere Alston STW in the second half of 2020 (Jun 19,20; Aug 14,18-21; Oct 14-17,20-23,26,29,30)

2021

WASP believes there were 16 illegal spilling days at Bere Alston STW in 2021 (**Fig**. 7).



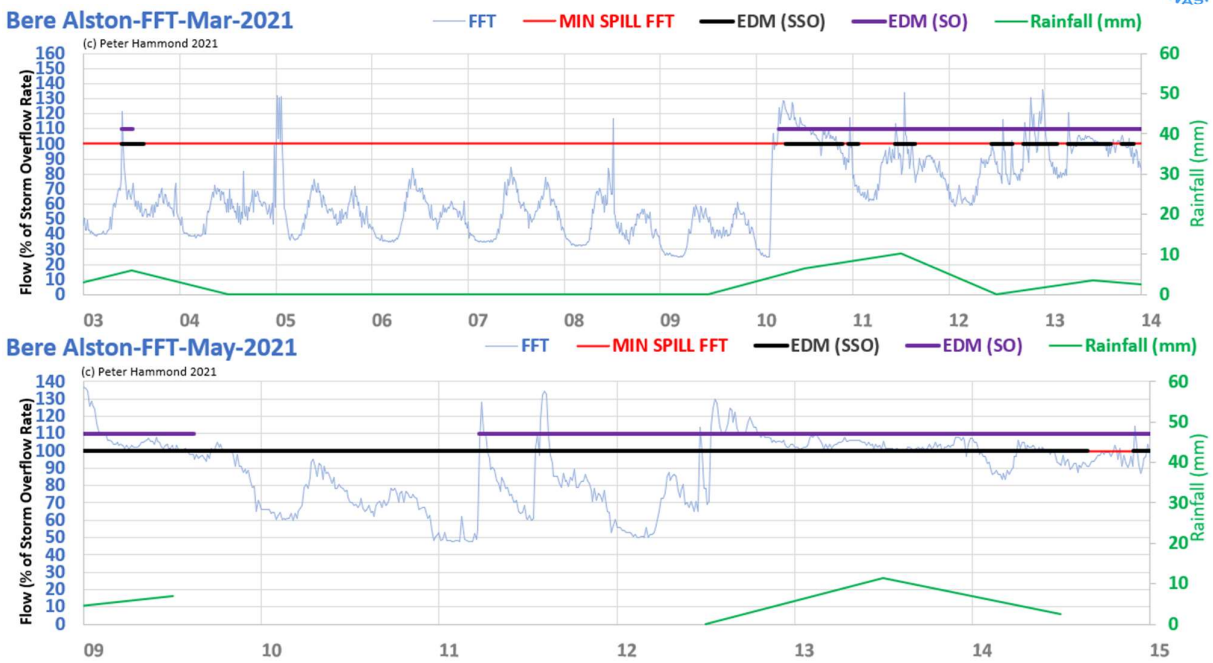


Figure 7: WASP believes there were 16 illegal spilling days at Bere Alston STW in 2021 (Feb 14-16,26-28; Mar 3,10-13; May 9-12,14)

Chudleigh STW – SOUTH WEST WATER (SWW)

year	EDM SUBMISSION TO EA hours	spills	active	comments	WASP beliefs/facts
2018	SSO: 3,303 SO: 0	SSO: 167 SO: 0	SSO: 98% SO: 98%		
2019	SSO:3,093 SO: 0.23	SSO: 156 SO: 4	SSO: 100% SO: 100%	A review of the use of the storm tanks which are being used for balancing flows needs to be carried out.	
2020	SSO: 2,638 SO: 163	SSO: 136 SO: 37	SSO: 100% SO: 100%	Following SOAF policy the performance of this storm overflow is currently being investigated. This asset has not been designed to meet SF directive	11 illegal spilling days
2021	SSO: 1,248 SO: 479	SSO:161 SO:87	SSO:100% SO:93%	Not asset maintenance - Hydraulic capacity U_INV driver - Stage 2 or 3: Environmental / UWWTR assessments or improvement options appraisal	12 illegal spilling days 100 spilling hours undeclared

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Table 1: EDM submissions to EA by South West Water for Chudleigh STW

Chudleigh STW serves a population of about 5,000. It discharges treated effluent to the River Teign and untreated storm discharge to a tributary of the River Teign via its inlet and storm tank.

2021

WASP does not have complete treatment data for 2021 but even so it is clear that the inlet spill data (SO) is not consistent with the treatment data in March and April 2021 (**Fig**. 1). Therefore, WASP considers the 2021 EDM submission to the EA to be at best unreliable.

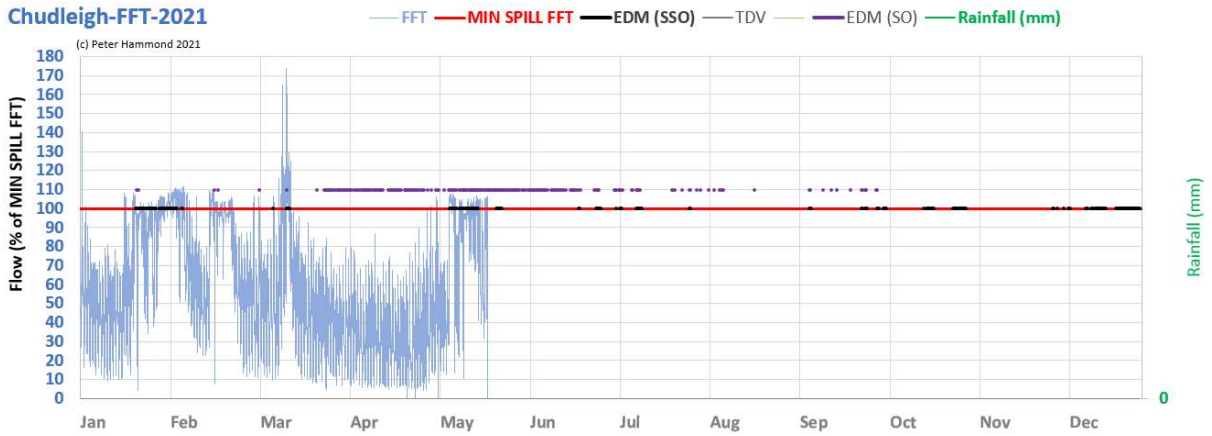


Figure 1: 2021 overview of detailed EDM spills and a subset of treatment data for Chudleigh STW

WASP also believes there are undeclared spills in February 2021 amounting to at least 100 spilling hours.

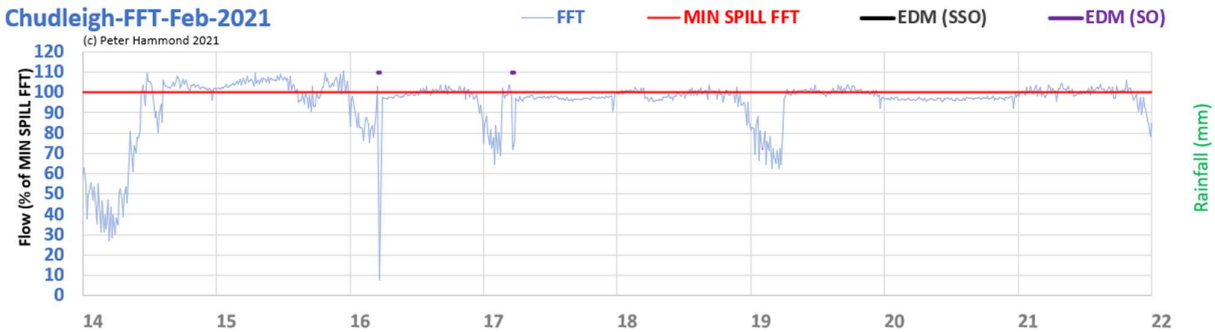


Figure 2: WASP believes there are undeclared discharges of untreated sewage in February 2021 at Chudleigh STW

Finally, for 2021, WASP believes there were at least 12 illegal spilling days at Chudleigh STW (Fig. 3).

Figure 3: WASP believes there were at least 12 illegal spilling days at Chudleigh STW in 2021 (Jan 20,22,24-26; May 10,12-17)

2020

As with 2021, the 2020 overview chart for Chudleigh STW suggests repeated spells of inconsistency between detailed spill and treatment (**Fig**. 4).

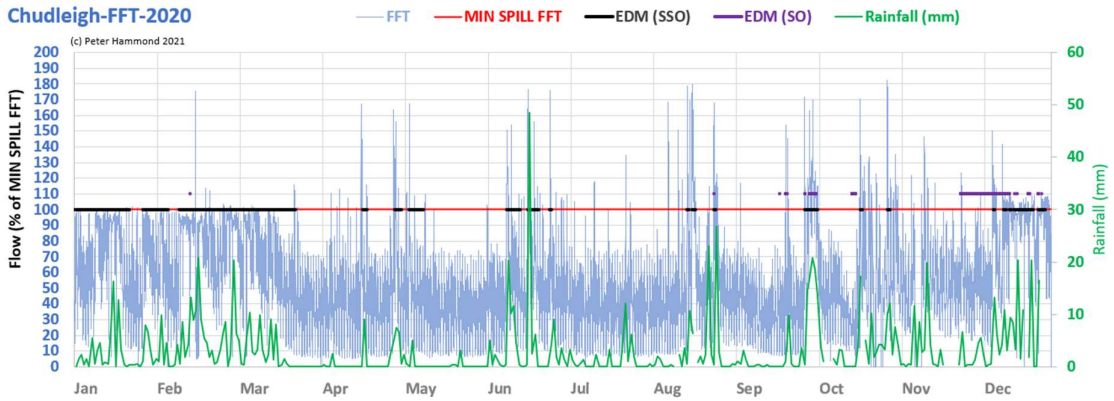


Figure 4: 2020 overview for Chudleigh STW showing treatment, detailed spill and daily rainfall data

Examples of inconsistency between treatment, rainfall and spill data provided by SWW are shown in **Fig**. 5.

Figure 5: WASP believes treatment and detailed spill data provided by SWW to be inconsistent and hence unreliable in May 2020

WASP believes there were at least 11 illegal spilling days at Chudleigh STW in 2020 (**Fig**. 6)

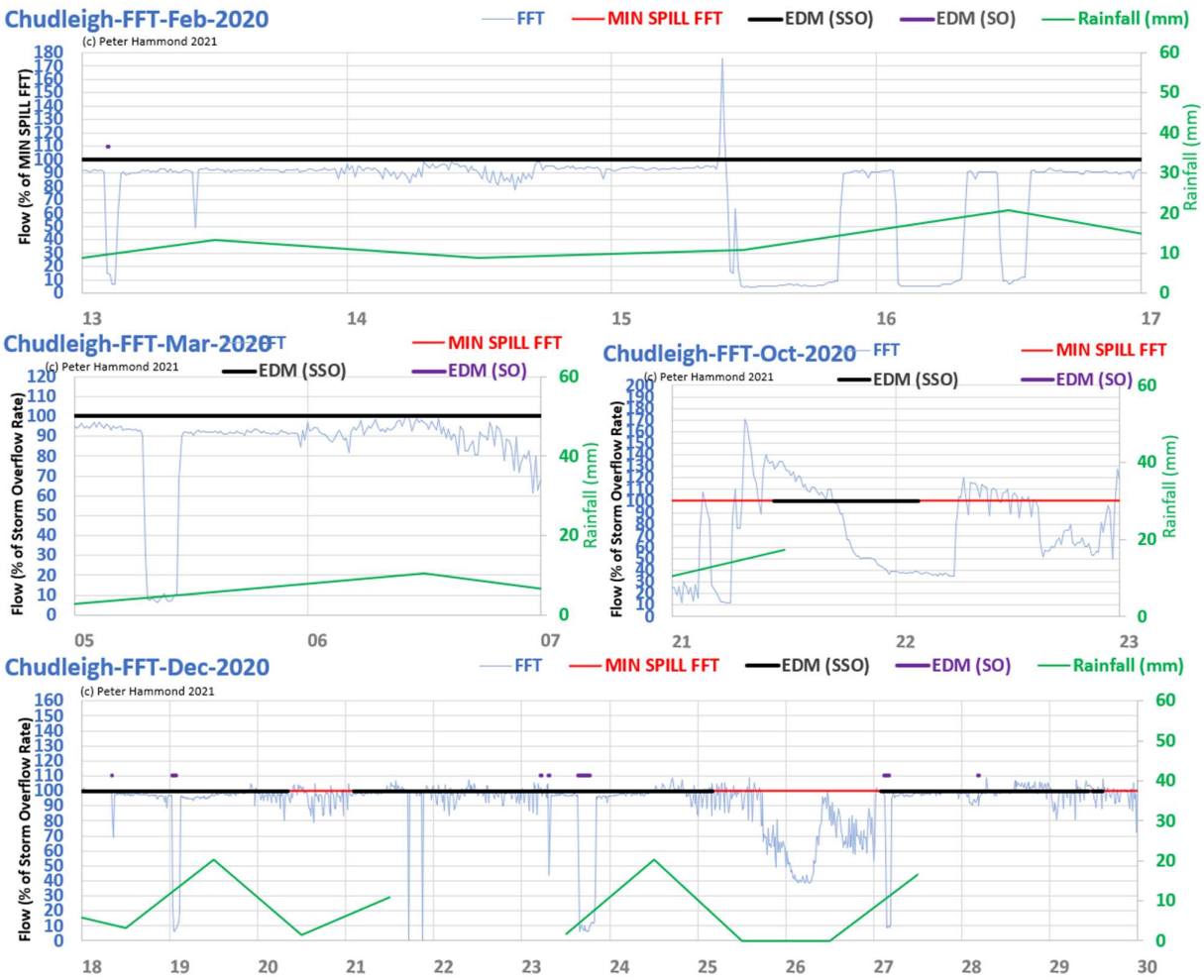


Figure 6: WASP believes there were at least 11 illegal spilling days in 2020 at Chudliegh STW (Feb 13-16; Mar 5-6; Oct 21-22; Dec 19,23,27)

2019 & 2018

WASP's EIR request to SWW asked for all individual spill start-stop times since the 2016 commissioning of EDMs at Chudleigh STW. Unfortunately, SWW withheld all detailed EDM data for 2017, 2018 and 2019. It appears that there were difficulties in siting and maintaining correct functioning of the EDM device throughout the three years 2017-2019 as suggested by the following entries in SWW's EDM submissions to the EA:

> *Due to the high number of spills recorded at this site, a site visit was carried out to check the location of the EDM to ensure it is in the correct location. The EDM at this site has been situated behind a weir plate. Due to the nature of the this structure a volume of water is always held. Tolerances on the measurement of spills over the weir mean that for an end of a spill to be recorded a significant reduction in level has to be achieved, therefore it can take several hours or even days for this to occur. As a result a spill we be recorded when in fact the instrument is seeing the level in the chamber at the same height as the weir, prolonging the spill duration / increased spill count. We will be looking to relocate the instrument to a more suitable location at the point of storm separation in the near future.*
>
> South West Water **2017** EDM submission to EA

An additional monitor was located on the storm tank to confirm the spills being recorded from the storm overflow chamber. It has been confirmed that the EDM installation is in a representative location and recorded spills from the storm chamber when the storm tank is full. On reviewing the storm tank data it appears that this is being used as balancing tank as there is no intelligence between the pump stations in the catchment, this is potentially utilising storm capacity. Further investigations into pump station intelligence to be investigated.

South West Water **2018** EDM submission to EA

A review of the use of the storm tanks which are being used for balancing flows needs to be carried out.

South West Water **2019** EDM submission to EA

The use of a storm tank as a balancing tank is totally unacceptable as it reduces the capacity for storm storage during genuine spills and will result in illegal early spilling.

Honiton STW – SOUTH WEST WATER (SWW)

year	EDM SUBMISSION TO EA hours	spills	active	comments	WASP beliefs/facts
2018					about 800 spilling hours
2019	SO:0 SSO:1,509	SO:0 SSO:84	SO:100% SSO:100%	Further investigation of the EDM set up is required as the data being returned is indicating that the premature spills may be occurring, if the EDM is not located in the most representative location then false spills may be being recorded. The permit for EDM reporting has not yet been issued, however as data is being collected we have included this asset in this return. Please note that this may not be a full years worth of data and the percentage of the year the EDM was operational relates to when data started to be collected.	
2020	SO:148 SSO:2,442	SO:16 SSO:137	SO:100% SSO:100%	Following the SOAF policy the performance of this storm overflow will be investigated in 2023.	at least 19 M litres of untreated sewage spilled via SSO at least 25 illegal spilling days
2021	SO:1,050 SSO:3,709	SO:130 SSO:192	SO:100% SSO:100%		in Jan-May storm tank spilled for 1,000 hours not 2,300

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Table 1: EDM submissions to EA by South West Water for Honiton STW

Honiton STW serves a population of about 14,000 and discharges to the River Otter. In just over 5 years between 2016 and 2021, the average dry weather flow (DWF) doubled from about 20 l/s to 40 l/s (**Fig**. 1).

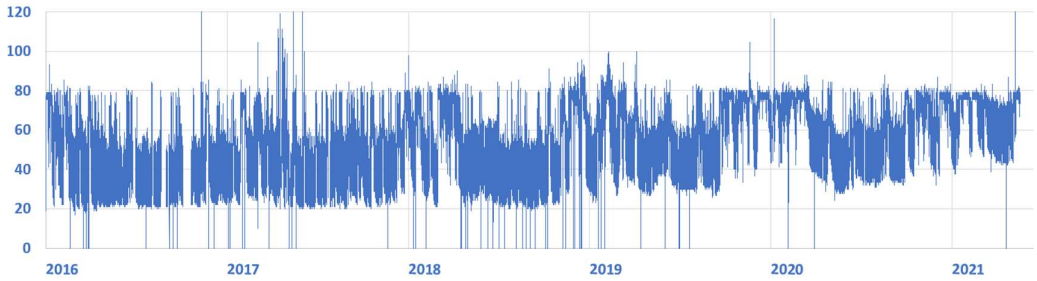


Figure 1: flow to full treatment at Honiton STW 2016 to 2021 showing year on year increase in dry weather flow

The design capacity/storm tank overflow rate is 77 l/s. Roughly speaking, the ratio of overflow rate to DWF reduced from 3.85 to 1.93. At 432 m^3, the storm tank is smaller than the EA requirement of 554.4 m^3 to hold 2 hrs flow at design capacity. Each of these makes spilling more likely.

2018

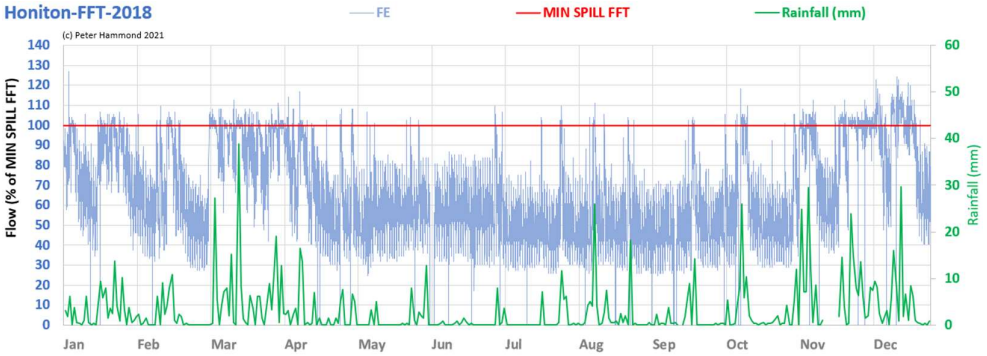


Figure 2: 2018 overview of sewage treatment ad rainfall data for Honiton STW

As there was no EDM in place in 2018, WASP has estimated the total spilling for 2018 for Honiton to be about 800 hours.

2019

The 2019 overview chart (**Fig.** 3) shows the detailed spill data provided by SWW to WASP which amount to 1,715 spilling hours compared to the total of 1,509 hours submitted to the EA by SWW. One explanation of this difference is that the spill data given to WASP is based on the peculiar block counting of spills introduced by the EA, and so the start/stop times don't correspond to a single spill but to a group. A second explanation is that SWW have given incorrect data to one (or both) of the EA and WASP.

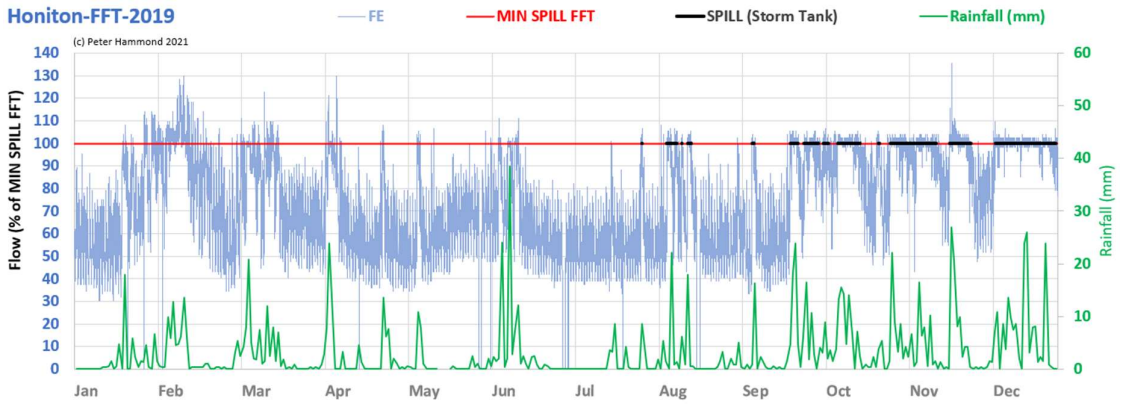


Figure 3: 2019 overview of sewage treatment, detailed spill and daily rainfall data for Honiton STW

If the data provided to WASP is a correct reflection of individual spills then WASP believes some of them are early and hence illegal. The comment provided in the 2019 submission by SWW to the EA suggests the data is unreliable.

2020

The 2020 overview chart for Honiton STW confirms consistency between the detailed spill and treatment data supplied by SWW to WASP with rainfall and river level data as well as with the summary spill data supplied to the EA.

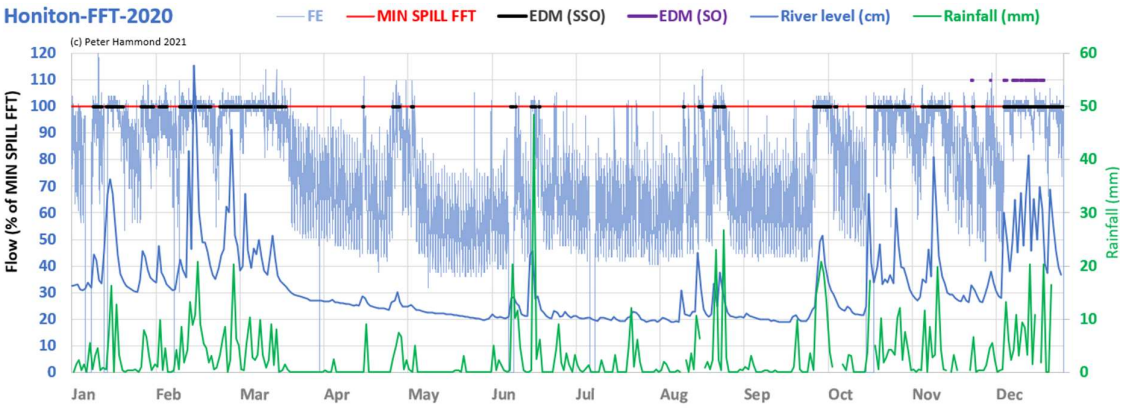
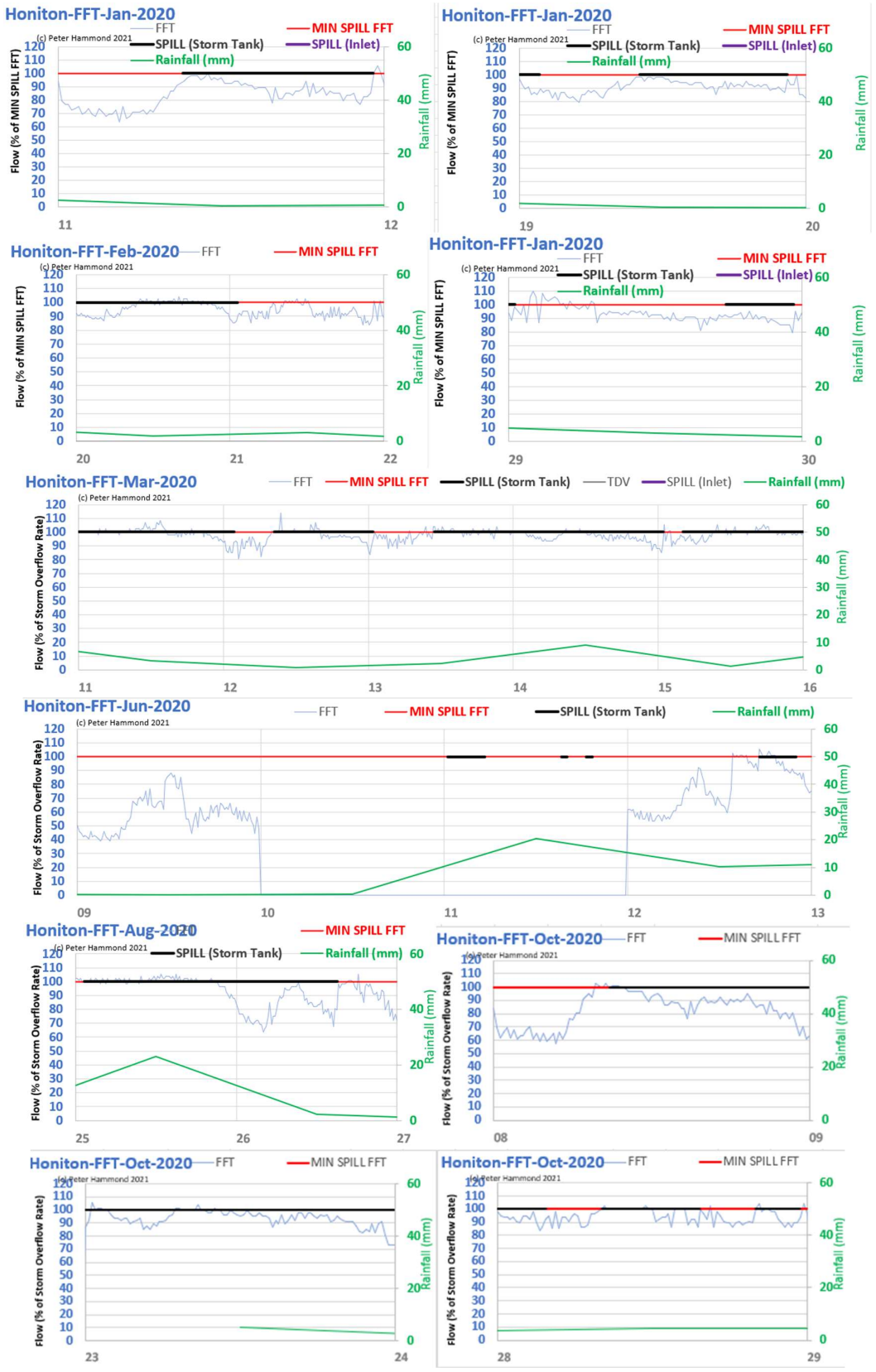


Figure 4: 2020 overview for Honiton STW of spill, rainfall, river level and treatment data

Even though the spill data supplied for the inlet storm overflow was for December, WASP believes that 31 million litres of untreated sewage was discharged via the storm tank overflow during 145 hours when both overflows were simultaneously in operation.

WASP also believes that there were 26 illegal spilling days at Honiton STW in 2020 (**Fig**. 5).


Honiton-FFT-Jan-2020
FFT
MIN SPILL FFT
(c) Peter Hammond 2021
SPILL (Storm Tank)
SPILL (Inlet)
Rainfall (mm)
Flow (% of MIN SPILL FFT)
Rainfall (mm)
Honiton-FFT-Jan-2020
FFT
MIN SPILL FFT
(c) Peter Hammond 2021
SPILL (Storm Tank)
SPILL (Inlet)
Rainfall (mm)
Flow (% of MIN SPILL FFT)
Rainfall (mm)
Honiton-FFT-Feb-2020
FFT
MIN SPILL FFT
(c) Peter Hammond 2021
Flow (% of MIN SPILL FFT)
Rainfall (mm)
Honiton-FFT-Jan-2020
FFT
MIN SPILL FFT
(c) Peter Hammond 2021
SPILL (Storm Tank)
SPILL (Inlet)
Rainfall (mm)
Flow (% of MIN SPILL FFT)
Rainfall (mm)
Honiton-FFT-Mar-2020
FFT
MIN SPILL FFT
SPILL (Storm Tank)
TDV
SPILL (Inlet)
Rainfall (mm)
(c) Peter Hammond 2021
Flow (% of Storm Overflow Rate)
Rainfall (mm)
Honiton-FFT-Jun-2020
FFT
MIN SPILL FFT
SPILL (Storm Tank)
Rainfall (mm)
(c) Peter Hammond 2021
Flow (% of Storm Overflow Rate)
Rainfall (mm)
Honiton-FFT-Aug-2020
MIN SPILL FFT
(c) Peter Hammond 2021
SPILL (Storm Tank)
Rainfall (mm)
Flow (% of Storm Overflow Rate)
Rainfall (mm)
Honiton-FFT-Oct-2020
FFT
MIN SPILL FFT
(c) Peter Hammond 2021
Flow (% of Storm Overflow Rate)
Rainfall (mm)
Honiton-FFT-Oct-2020
FFT
MIN SPILL FFT
(c) Peter Hammond 2021
Flow (% of Storm Overflow Rate)
Rainfall (mm)
Honiton-FFT-Oct-2020
FFT
MIN SPILL FFT
(c) Peter Hammond 2021
Flow (% of Storm Overflow Rate)
Rainfall (mm)

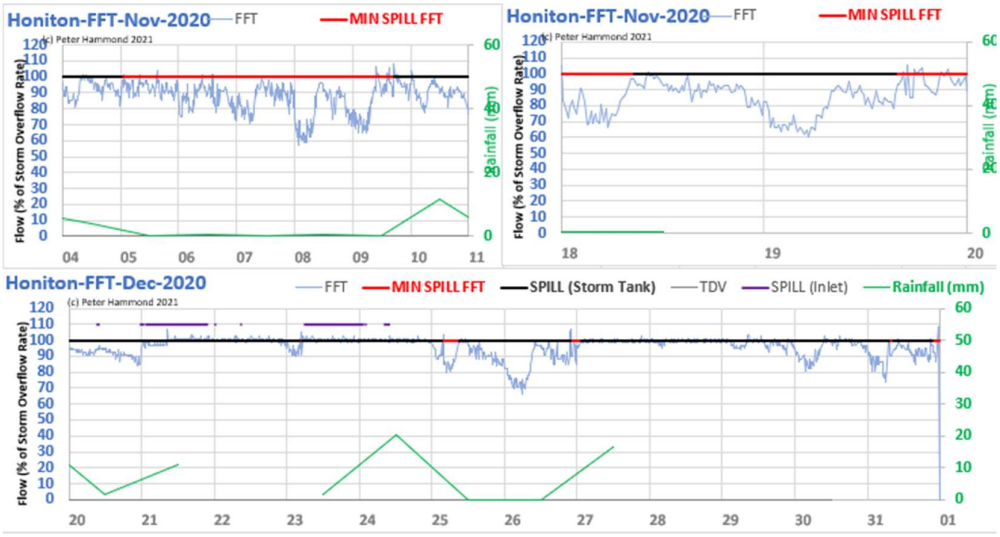


Figure 5: WASP believes there were at least 26 illegal spilling days at Honiton STW in 2020 (Jan 11,19,29; Feb 20-21; Mar 11-14; Jun 11-12; Aug 25-26; Oct 8,23,28; Nov 4,9,10,18,19; Dec 20,25-26,30,31)

2021

The 2021 sewage treatment data at Honiton STW available to WASP are incomplete. Nevertheless, it clear from the data that are available that there is a serious incompatibility between spill and rainfall data suggesting that the former is unreliable. For example, **Fig**. 6 suggests that the EDM on the inlet storm overflow is consistent with sewage treatment and rainfall data. In contrast, the EDM on the storm tank appears to suggest a spill for pretty well all of February and March which is seriously inconsistent with the treatment and rainfall data. WASP estimates that in the first five months of 2021, Honiton STW's storm tank spilled for about 1,000 hours as opposed to the 2,400 hours suggested by the EDM.

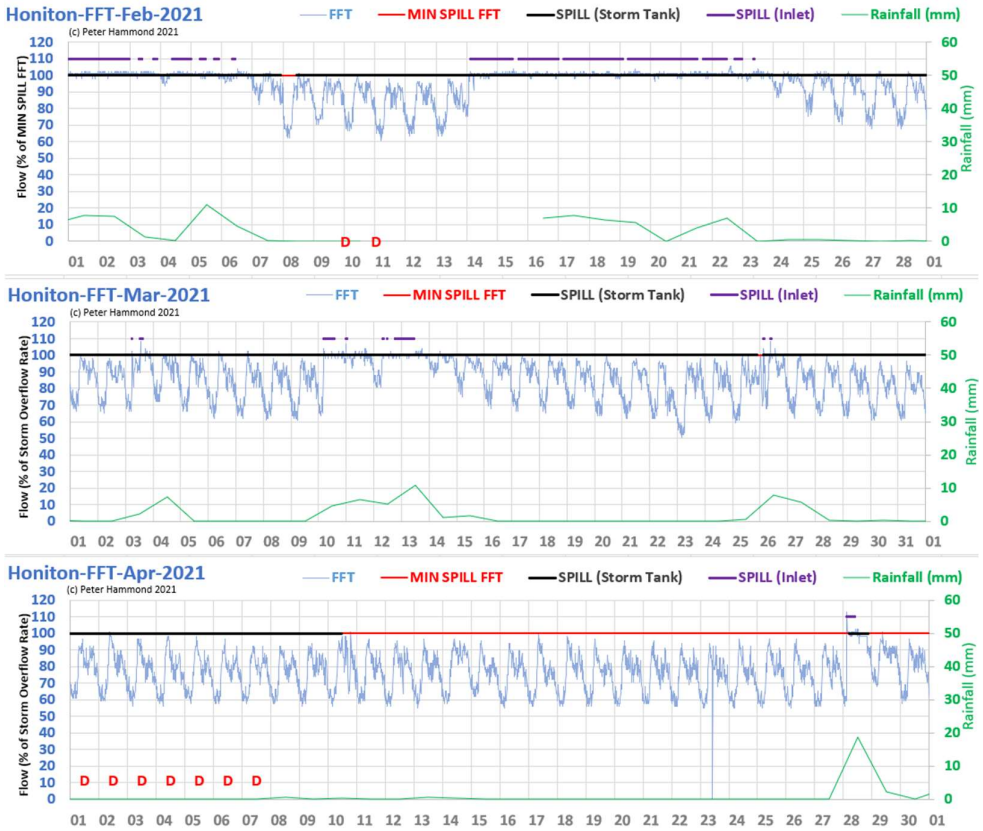


Figure 6: WASP believes the storm tank EDM at Honiton STW to be unreliable in contrast to the inlet storm EDM

Ivybridge STW – SOUTH WEST WATER (SWW)

year	EDM SUBMISSION TO EA hours	spills	active	comments	WASP beliefs/facts
2018	Inlet SO:719 SSO: 2,952	Inlet SO:58 SSO: 139	Inlet SO:100% SSO: 100%	This asset met its expected design overflow value in the bathing season with only 1 spill of unknown volume reported in the season (designed for 3 significant spills). The remaining 138 spills occurred outside of bathing season. There is an issue with infiltration in the catchment which will be investigated. During periods of high rainfall the river which runs alongside the treatment works reaches its tipping point appears to be entering the inlet. To be investigated under BW_INV4 AMP 7	at least 20 illegal spilling days
2019	Inlet SO:504 SSO: 1,951	Inlet SO:58 SSO: 98	Inlet SO:100% SSO: 100%	To be investigated under BW_INV4 in AMP7	at least 18 illegal spiling days 194 M litres of sewage spilled
2020	Inlet SO:718 SSO: 2,190	Inlet SO:61 SSO: 103	Inlet SO:100% SSO: 100%	To be scheduled into either the SOAF or SFTP investigations programme.	at least 13 illegal spiling days 136 M litres of sewage spilled
2021	Inlet SO:426 SSO: 1,176	Inlet SO:40 SSO: 56	Inlet SO:100% SSO: 100%		at least 12 illegal spilling days 79 M litres of sewage spilled

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Table 1: EDM submissions to EA by South West Water for Ivybridge STW

Ivybridge TW spills into the River Erme which ends up at Mothecombe Beach. It serves a population equivalent of about 12,670. The submissions to the EA by SWW confirm that Ivybridge STW spilled from its storm tank (SSO) for 2,190 hours and 1,176 hours respectively for 2020 and 2021 – a reduction of 46%. In contrast, the proportion of "early" spilling days increased from 9% to 14%.

2018

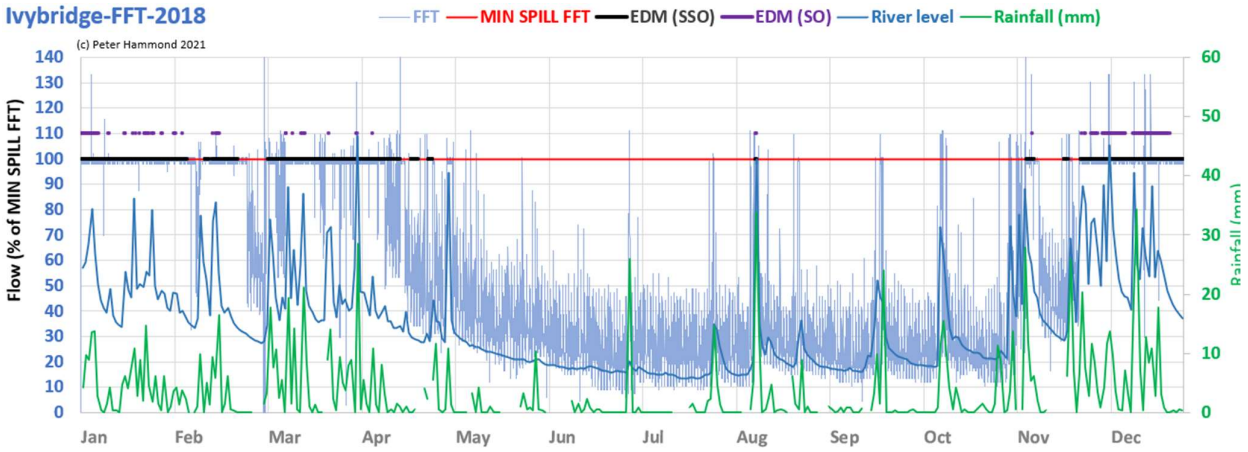


Figure 1: 2018 overview of treatment, spill, daily rainfall and river level data for Ivybridge STW

The 2018 overview chart for Ivybridge STW clearly shows that when spills occur, the receiving river is not necessarily as swollen as WaSCs and the EA like to suggest. So the dilution factor varies considerably during a spill. Both overflows were simultaneously in operation for about 720 hours when WASP believes that at least **194 million litres of untreated sewage were discharged via the storm tank overflow**. It is not possible to estimate the volume of untreated sewage that was discharged via the inlet overflow.

WASP believes there were at least 20 illegal spilling days at Ivybridge STW in 2018 (**Fig**. 2).

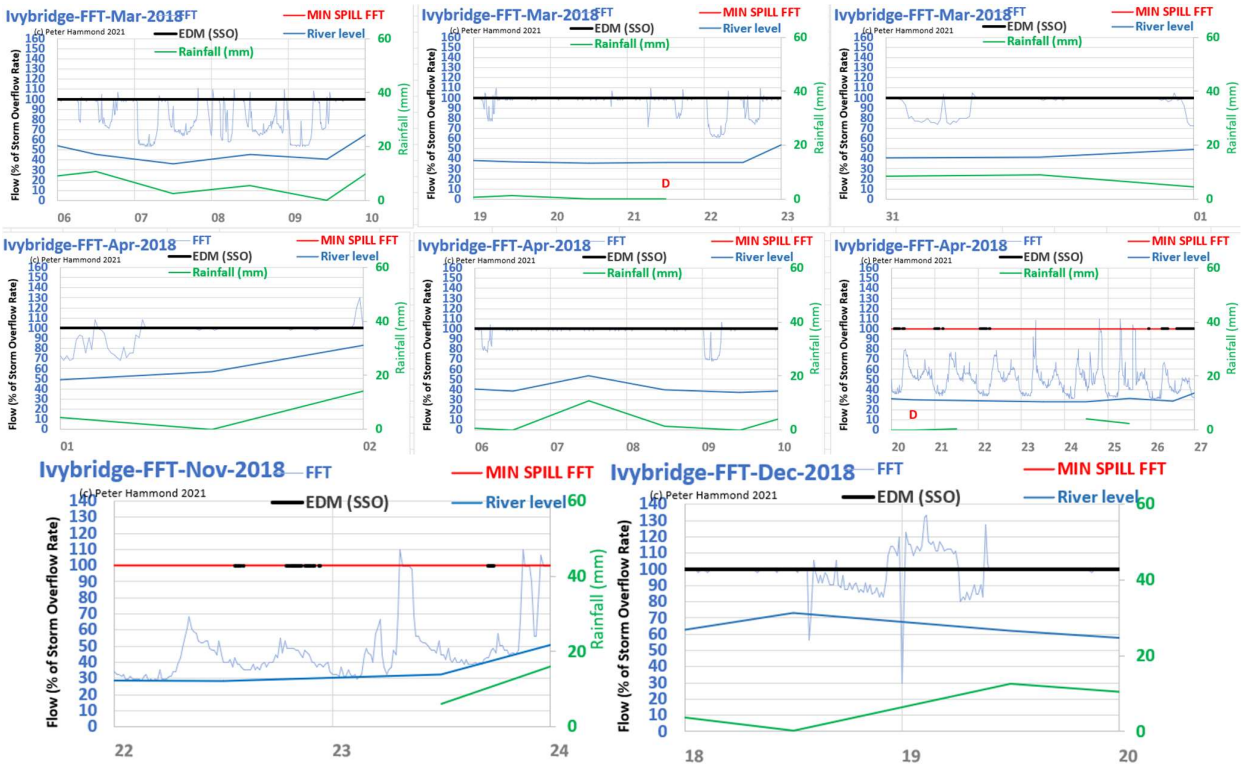


Figure 2: WASP believes there were at least 20 illegal spilling days at Ivybridge STW in 2018 (Mar 6-9,19,21-22,31; Apr 1,6,9,20-22,25-26; Nov 22-23; Dec 18-19)

2019

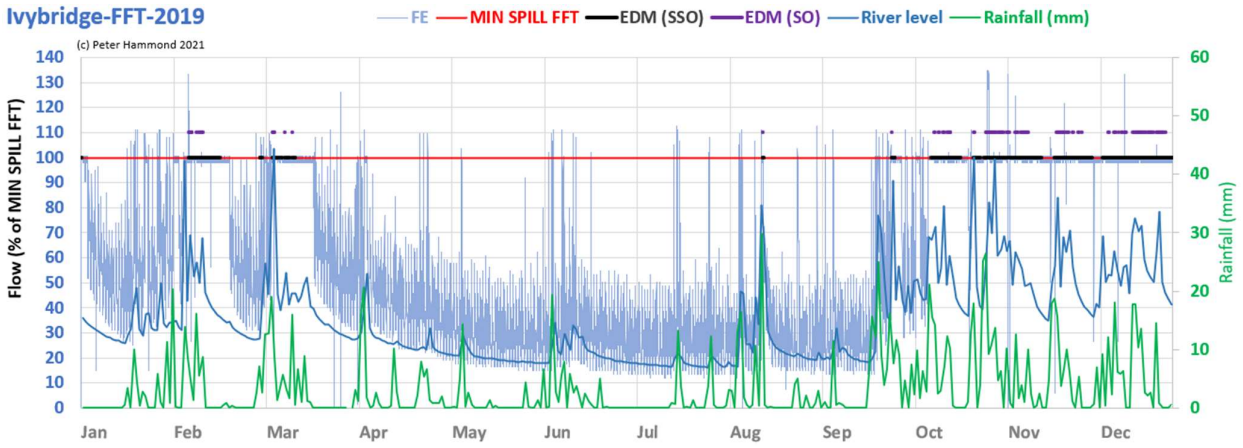


Figure 3: 2019 overview of treatment, spill, daily rainfall and river level data for Ivybridge STW

The 2019 overview chart (**Fig**. 3) shows that both SO and SSO overflows were simultaneously in operation for about 504 hours during which WASP believes that more than **136 million litres of untreated sewage were discharged via the storm tank overflow**. It is not possible to estimate how much untreated sewage was discharged via the inlet overflow.

WASP also believes there were at least 18 illegal spilling days at Ivybridge STW in 2019 (**Fig**. 4).

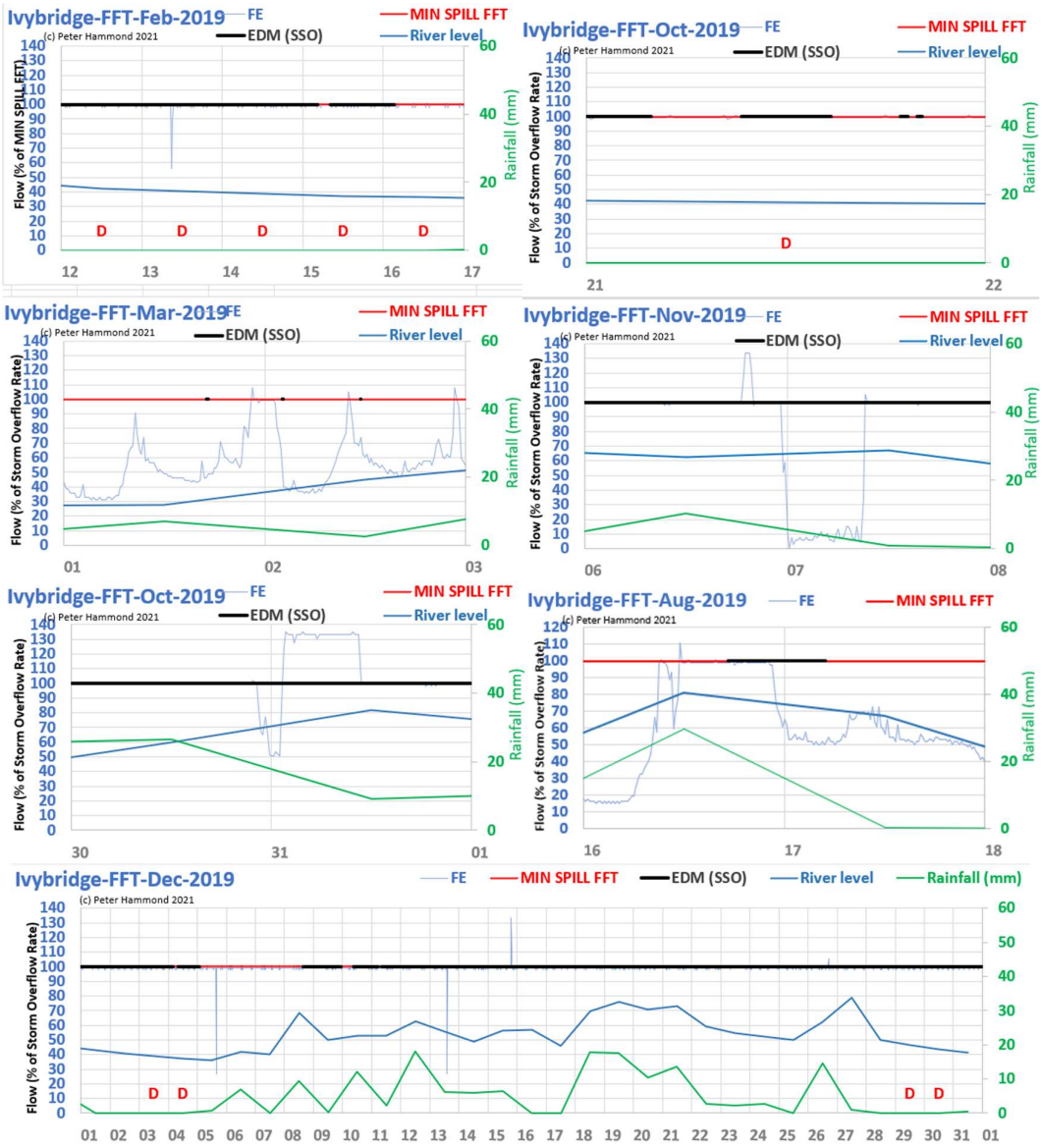


Figure 4: WASP believes there were at least 10 illegal dry and 8 illegal early spilling days at Ivybridge STW in 2019 (Feb 12-16; Mar 1-2; Aug 16-17; Oct 21,30-31; Nov 6-7; Dec 3-4,29-30)

2020

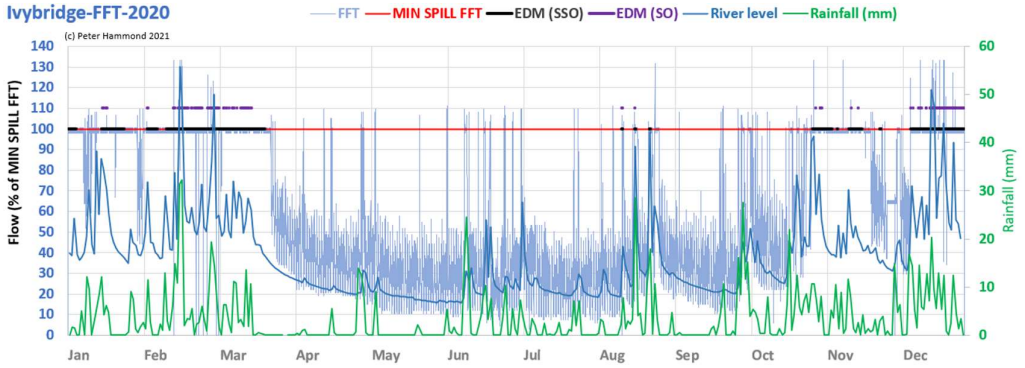


Figure 5: 2020 overview chart of treatment, spill, daily rainfall and river level data for Ivybridge STW

The 2020 overview chart (**Fig**. 5) shows that both SO and SSO overflows were simultaneously in operation for about 718 hours during which WASP believes that more than 193 million litres of untreated sewage

were discharged via the storm tank overflow. It is not possible to estimate how much untreated sewage was discharged via the inlet overflow.

WASP also believes that there were at least 5 early and 8 dry illegal spilling days at Ivybridge STW in 2020 (**Fig**. 6).

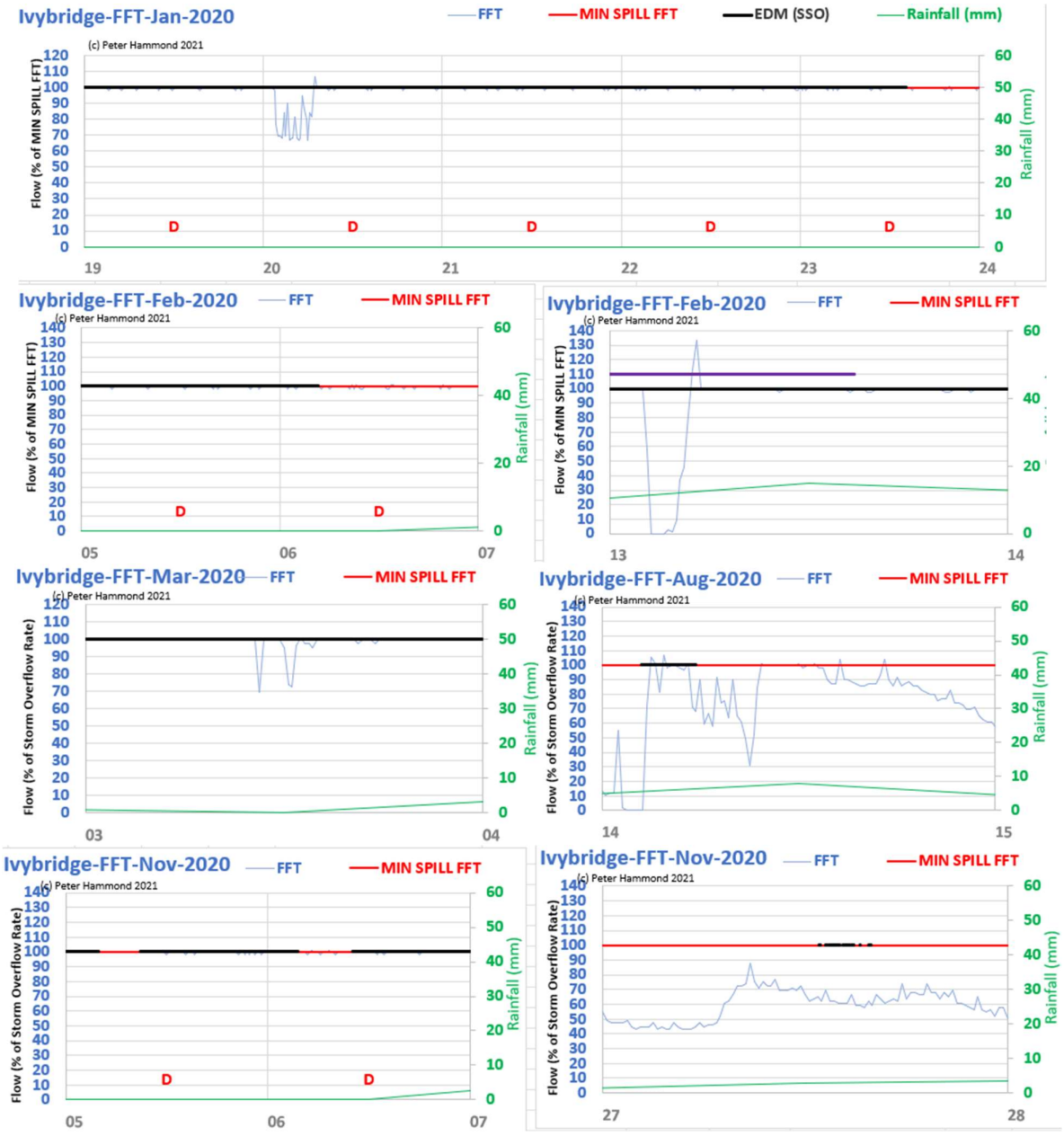


Figure 6: WASP believes there were 13 illegal spilling days in 2020 (Jan 19-23; Feb 5-6,13; Mar 3; Aug 14; Nov 5-6,27)

2021

The 2021 overview chart (**Fig**. 7) shows that both SO and SSO overflows were simultaneously in operation for about 293 hours during which WASP believes that more than **79 million litres of untreated sewage were discharged via the storm tank overflow**. It is not possible to estimate how much untreated sewage was discharged via the inlet overflow.

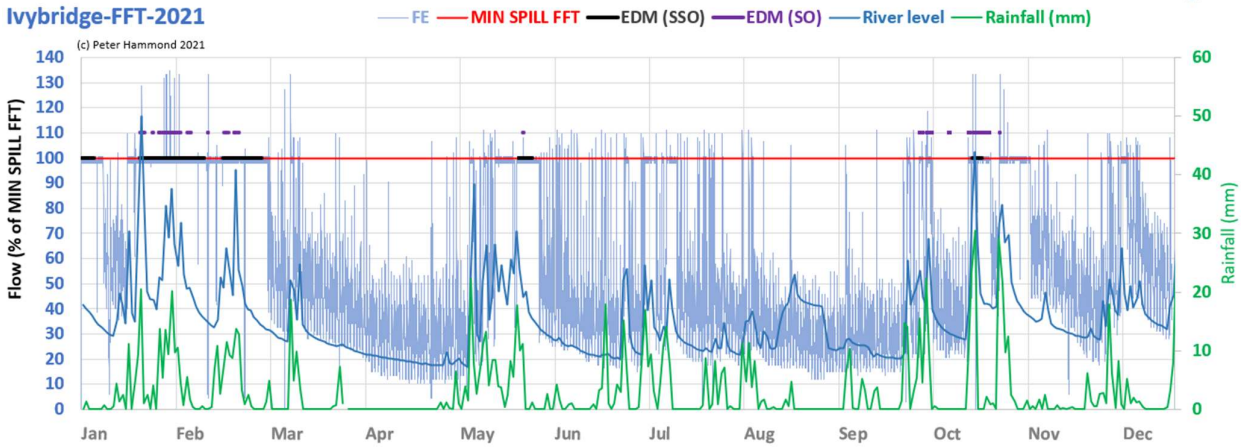


Figure 7: 2022 overview chart of treatment, spill, daily rainfall and river level data for Ivybridge STW

WASP also believes that there were at least 4 illegal early and 8 illegal dry spilling days at Ivybridge STW in 2021 (**Fig**. 8).

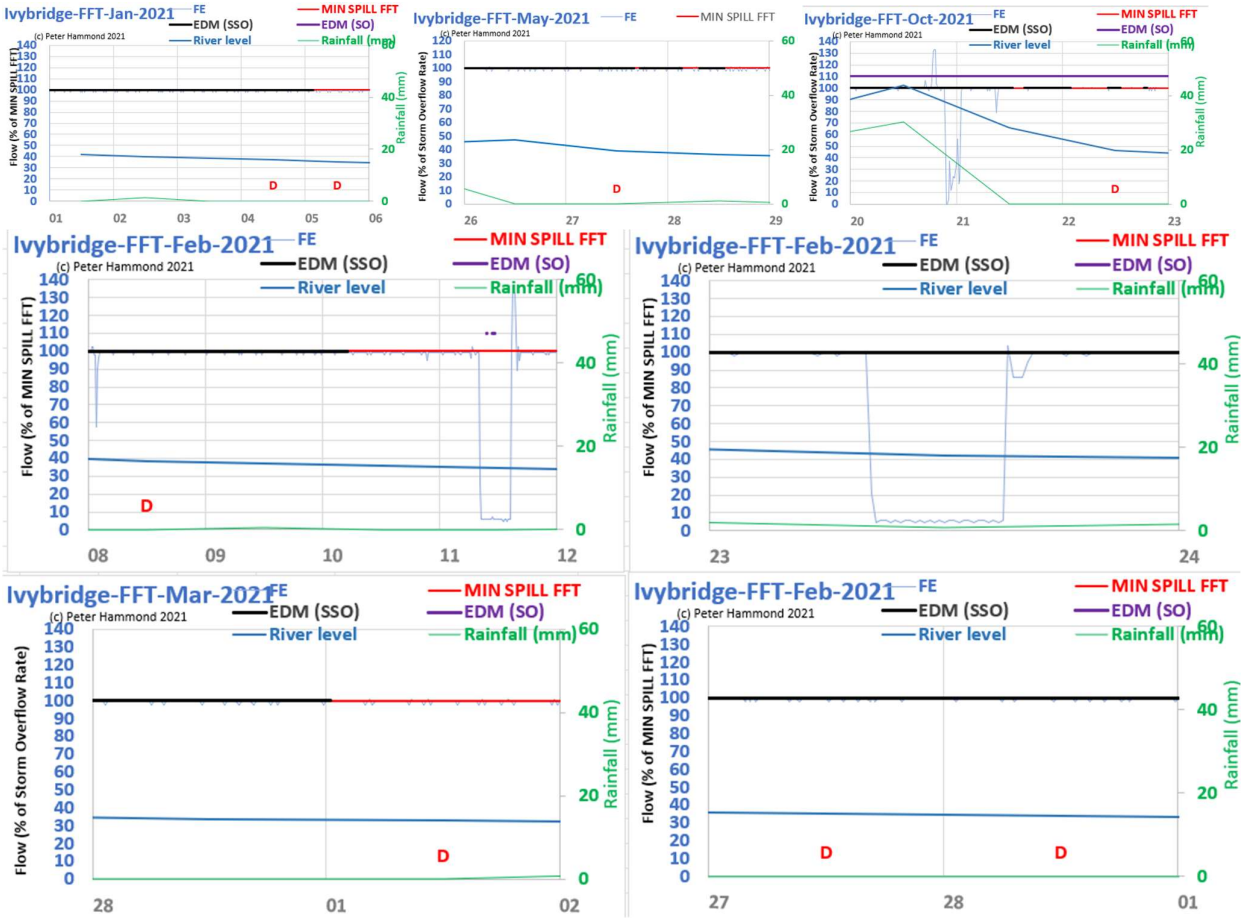


Figure 8: WASP believes there were 8 illegal dry and 4 illegal early spilling days at Ivybridge STW in 2021 (Jan 4-5; Feb 8,11,23,27,28; Apr 1; May 27; Oct 20-22)

PAR STW and ST AUSTELL STW - SOUTH WEST WATER (SWW)

WASP was approached by residents of Par in Cornwall to help in their long battle with South West Water and the Environment Agency to solve flooding and sewage problems. For over 10 years, "flooding" has caused sewers to overflow into residential areas resulting in untreated sewage entering homes on an annual basis[17].

WASP submitted an ER request to SWW asking for detailed spill and sewage treatment data as follows:

> *Par and St Austell STWs:*
> *a) All 15-min flow to treatment and 15-mn final effluent flow data for 1/1/2009 to the present (MCERTS if possible);*
> *b) All total daily volume treatment data as provided to the EA for the same period as in a) above;*
> *c) All individual spill start-stop times (not block counted) for all EDM monitors at the works from installation to the present; All flow and EDM spill start-stop data for terminal pumping stations that contribute to either of the STWs.*
>
> WASP EIR request to SWW on 6/6/2022

SWW replied on 20th July 2022 and provided data corresponding to c) above. SWW refused to provide treatment data (corresponding to a) and b) above) citing the EA investigation into water companies on the following grounds:

> *SWW will not be providing this data under the exception in Regulation 12(5)(b) of the Regulations which provides that environmental information may be withheld where disclosure could 'adversely affect the course of justice, the ability of a person to receive a fair trial or the ability of a public authority to conduct an enquiry of a criminal or disciplinary nature'*
>
> SWW response on 20/7/022 to EIR request from WASP

WASP requested an internal review of SWW on 24/7/2022. SWW did not provide the result of the internal review until 8/9/2022 when the appeal was rejected on similar grounds but with more detailed reference to analysis that "third parties" might undertake of the data should they be provided:

> Release of FFT/ Flow data could result in third parties carrying out their own analysis of whether or not SWW has complied with its STW permits in respect of the use of storm overflows. These analyses may or may not be accurate and could, for example, be the subject of media attention and/or political attention through lobbying MPs. This in turn could result in pressure being directly or indirectly applied by the public, interested parties, politicians and media outlets to the independent regulators who are responsible for enforcing compliance with environmental permits and regulation. This could result in an adverse effect on the course of justice with public opinion unduly influencing the outcome of a regulatory investigation. As such we consider that the adverse effect test is satisfied.
>
> SWW's grounds on 8/9/2022 for rejecting WASP's appeal

WASP will be making an appeal to the Information Commissioner's Office in due course.

[17] https://www.bbc.co.uk/news/uk-england-15441827

SIDMOUTH STW - SOUTH WEST WATER (SWW)

SWW refused on 07/09/2022 to provide sewage treatment data, telemetry alarm data and records of visits of operators at Sidmouth STW in response to an EIR submitted by WASP on 7/7/2022. WASP is considering the most appropriate action given SWW's response for Par and St Austell STWs. Before an appeal to the ICO is possible, it is necessary to request an internal review by SWW.

THAMES WATER(TW)

Burford STW – THAMES WATER (TW)

EDM SUBMISSION TO EA					WASP beliefs/facts
year	hours	spills	active	comments	
2018	0	0	100.00%		analysed in a previous WASP report
2019	0	0	100.00%		analysed in a previous WASP report
2020	1.85	1	100.00%		analysed in a previous WASP report
2021	0	0	98.28%		1 unreported spill admitted by Thames Water

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Table 1: EDM submissions to EA by Thames Water for Burford STW

Burford STW serves a population of less than 2,000 and discharges into the River Windrush. WASP's first instance of finding an unreported spill subsequently admitted by TW was at Burford STW in December 2017. In the past 4 years, TW has submitted zero or extremely low spilling hours. WASP's scepticism about some of these submissions was expressed to TW who kindly agreed to install a time-lapse camera on the storm tank and EDM monitor with online access.

In 2022, WASP submitted an EIR to TW following up an internal review of a TW response to an earlier EIR request that WASP believed was unsatisfactory. The new EIR request asked about telemetry alarm data and examples of gaps in effluent flow data in March, April and September 2021 (**Fig**. 1). WASP was concerned that the telemetry alarm data provided was incomplete (which TW admitted later to be the case).

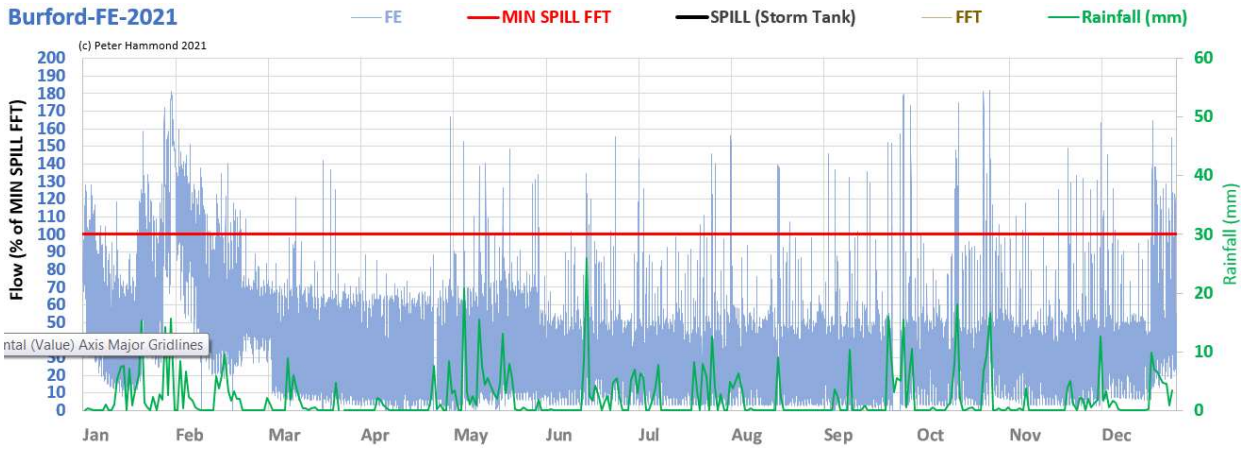


Figure 1: 2021 overview of Burford STW effluent flow and rainfall showing 2 gaps in flow in Mar, Apr and Sept 2021

WASP also provided evidence that on October 31st 2021, there was a high flow into the works (**Fig**. 2)

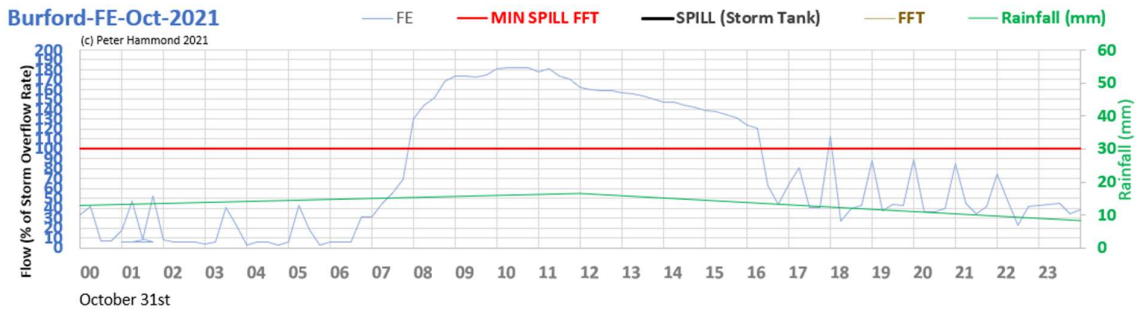


Figure 2: flow and final effluent flow data for October 31st 2021 at Burford STW

and that photographs observing the storm overflow tank and EDM monitor (bottom left corner) clearly show there was discharge from the storm tank around 10 am (**Fig**. 3).

Figure 3: time lapse photographs of Burford STW's storm tank and EDM monitor (bottom left corner) recording an unreported and undetected spill

This spill was not captured by the EDM device installed – indeed, there were no spills reported at all for TW's spill data submission to the EA or in reply to a separate EIR to TW by WASP. On August 12th 2022, TW replied as follows:

> "*we have investigated and believe that the weir threshold may be set incorrectly on the EDM, such that it failed to record all discharges. As such, we are investigating further and will be re-submitting corrected data to the Environment Agency."* **Thames Water**

WASP is awaiting further confirmation of a corrected submission to the EA and will be reviewing EDM submissions for earlier years.

Bicester STW - Thames Water(TW)

Year	hours	count	active	comments	WASP beliefs/facts
2018					
2019					
2020	1236	116	100.00%		5 illegal spilling days
2021	556	63	87.51%	Sensor failure / Issue resolved October	TW reported 734 spilling hrs to WASP 4 illegal spilling days

Table 1: EDM annual summary spill data submitted to EA by Thames Water for Bicester STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Bicester STW serves a population equivalent of almost 60,000 and discharges to the Langford Brook.

2021

In response to an EIR from WASP, Thames Water provided detailed start/stop times that correspond to 734 hours of spilling on 59 days. These appear to be consistent with river level and rainfall data but not with the summary spilling hours of 556 hours submitted to the EA.

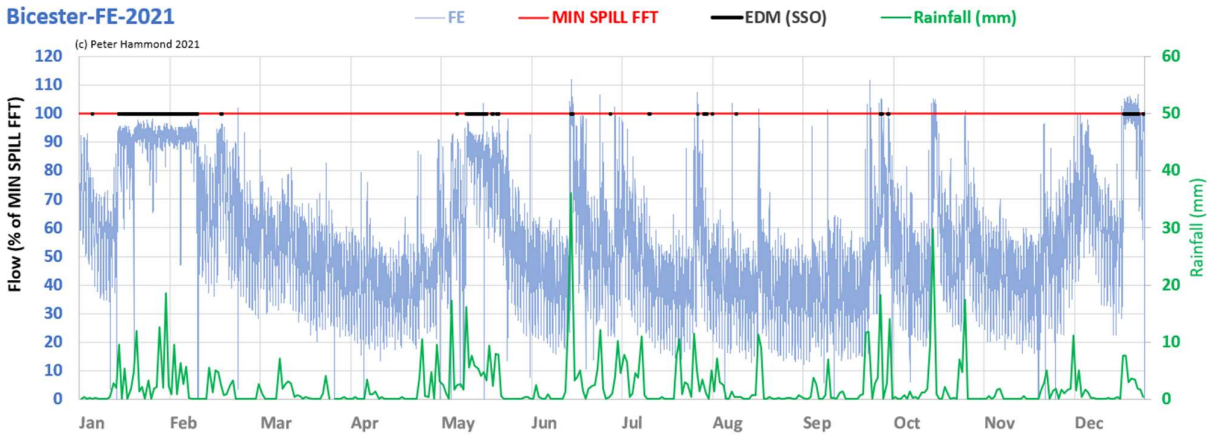


Figure 1: 2021 overview for final effluent, individual spill data and daily rainfall for Bicester STW

In addition to the discrepancy between spill data provided to the EA and that provided to WASP, WASP believes there were 4 illegal spills at Bicester STW in 2021 (**Fig**. 2).

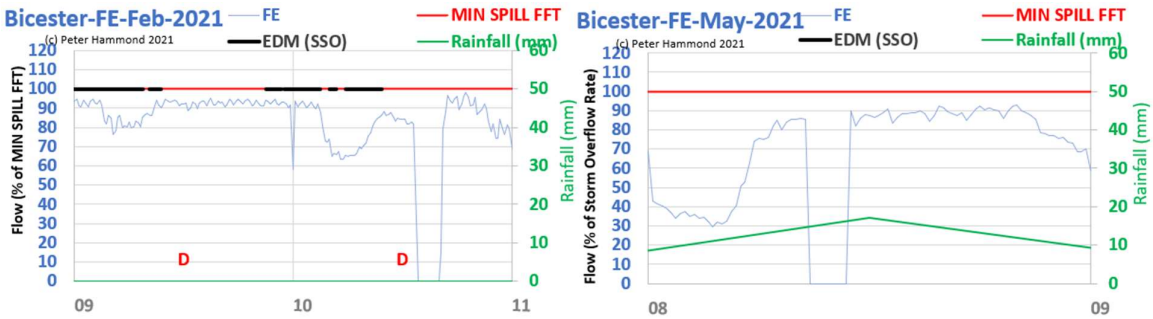


Figure 2: WASP believes there were illegal spills at Biceester STW on Feb 9-10 and May 8

2020

There are periods where the detailed spill data provided to WASP does not look consistent with sewage treatment and rainfall data (**Fig**. 3).

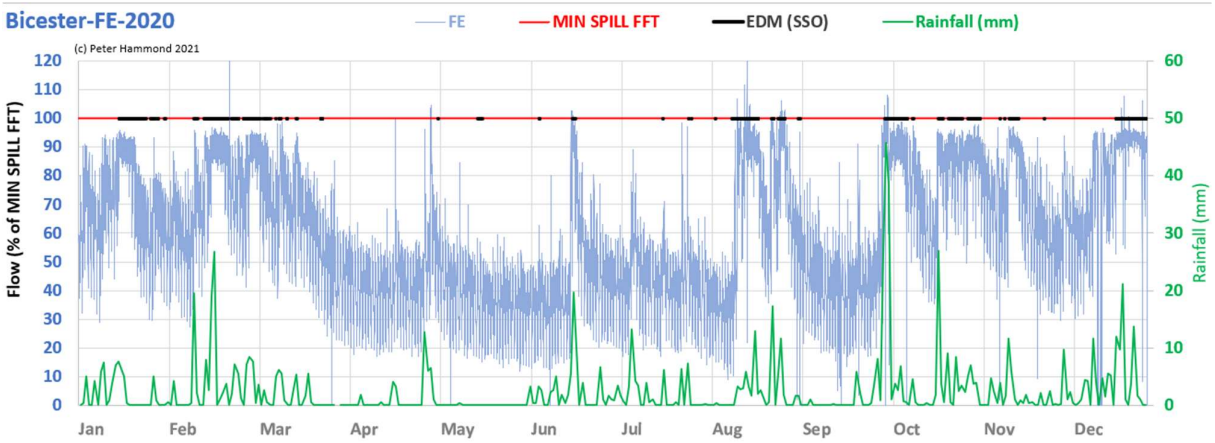


Figure 3: 2020 overview for final effluent, individual spill data and daily rainfall for Bicester STW

For example, the spilling on Jan 14-20 (**Fig**. 4) looks consistent but the later spills are less so.

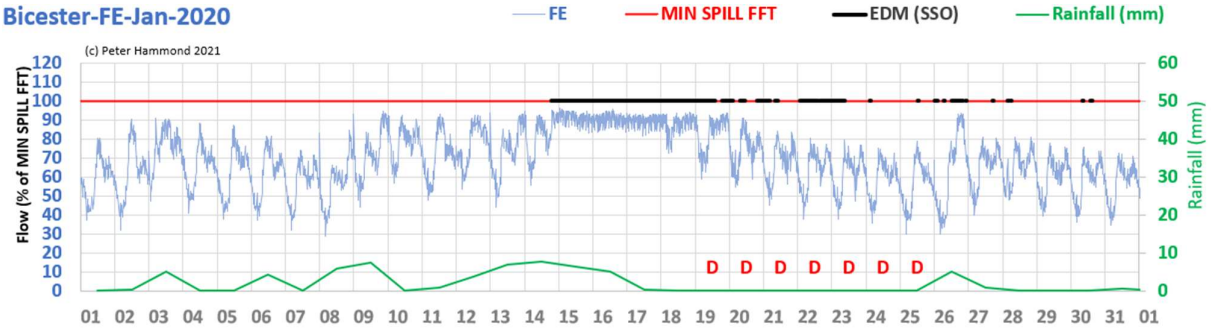


Figure 4: WASP believes spills in 2nd half of Jan are unreliable and that Jan 19-20 involved illegal dry spilling

WASP believes there was an unreported, illegal spill on May 8th and illegal spills on Feb 9-10 (**Fig 5)**

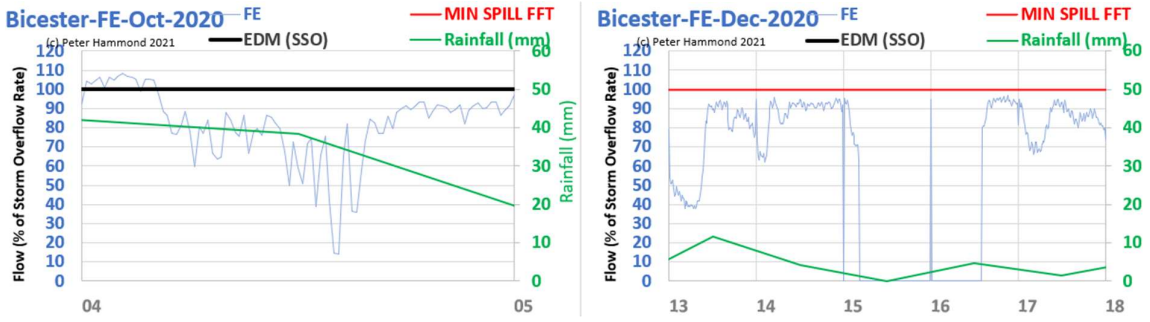


Figure 5: WASP believes there were illegal spilling days at Bicester STW on Oct 4 and Dec 15-16

Henley STW - THAMES WATER (TW)

EDM SUBMISSION TO EA					
year	hours	spills	active	comments	WASP beliefs/facts
2018	0.5	1	100.00%		3 further spilling days 2 illegal spilling days
2019	0	0	100.00%		
2020	0	0	100.00%		64 spilling hours in TW's EIR response to WASP 7 illegal spilling days
2021	143.56	9	98.38%		spill data are unreliable or all 9 spills are illegal

Table 1: EDM annual summary spill data submitted to EA by Thames Water for Henley STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Henley STW serves a population equivalent of over 14,000 and discharges to the Fawley Court Stream which joins the River Thames. The load on Henley STW has increased dramatically in the past 10 years from about 70% to almost 95% capacity[18].

TW was fined[19] £2.3M in 2021 for a spill in April 2016 that killed over 1,000 fish in the Fawley Court Stream. The 4-day event can be clearly seen as a dramatic loss of flow leaving the works via the treated effluent route (**Fig**. 1) over 23th-26th April.

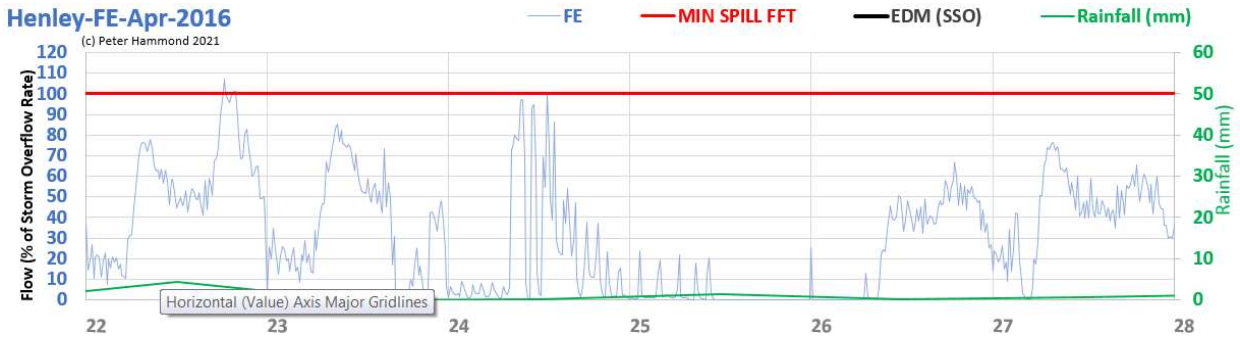


Figure 1: April 23-26 2016 final effluent reflecting a spill and consequent fish kill in the Fawley Court Stream

2018

Even though TW's 2018 spill data submission to the EA declared a spill of just 30 mins on October 14th, WASP believes that it lasted longer and the spilling likely occurred over 2 days (**Fig**. 2) with 2 illegal spills occurring on Oct 14th and 15th. Similarly, WASP believes there is evidence of further spills on Dec 7th and 10th, the first of which WASP believes was illegal.

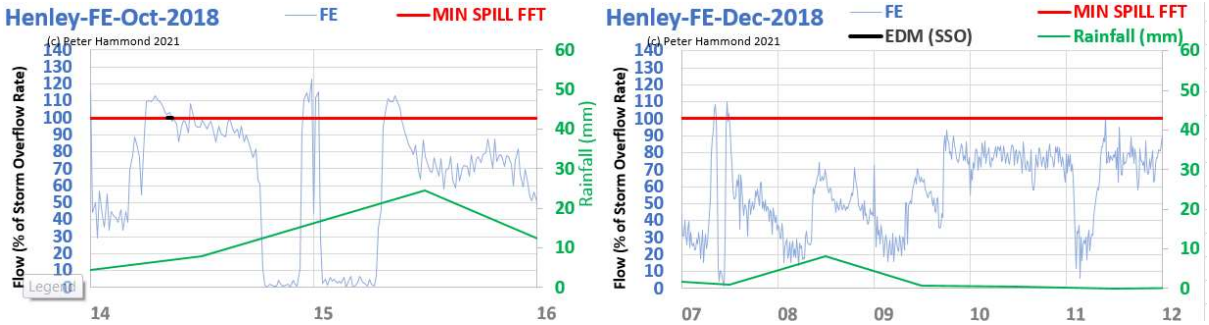


Figure 2: WASP believes the declared spill on Oct 14 was underplayed by TW and there were spills on Dec 7 & 10

[18] https://uwwtd.eu/United-Kingdom/treatment-plant/ukenthtwutp000079/history
[19] https://www.bbc.co.uk/news/uk-england-oxfordshire-56251889

2020

WASP believes there were 7 illegal spilling days at Henley STW in 2020 (**Fig**. 3)

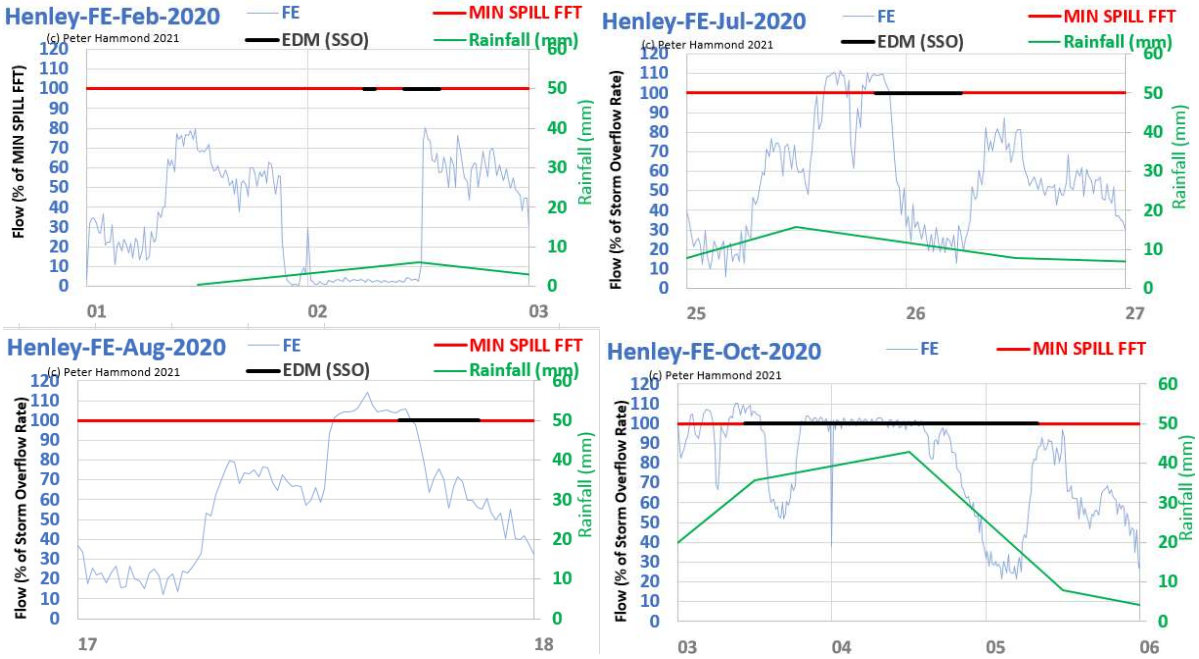


Figure 3: WASP believes there were 7 illegal spilling days at Henley STW in 2020

2021

The 2021 sewage treatment data provided to WASP for Henley STW had a large gap of more than 2 months when it has not been possible to undertake any analysis.

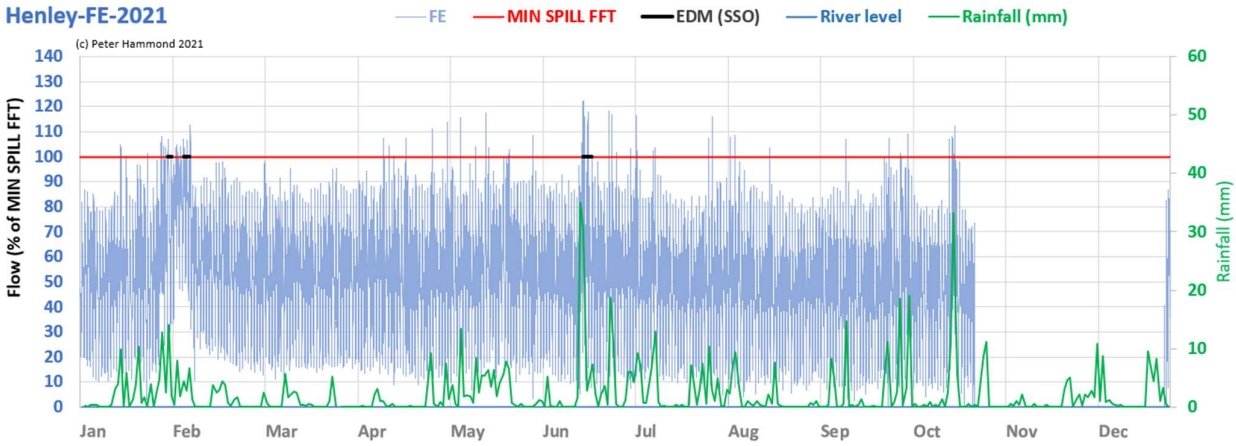


Figure 4: 2021 overview for Henley STW of spill, rainfall and treatment data showing a large gap in the latter

All of the spills in 2021 appear to be inconsistent with the sewage treatment data and hence are unreliable. An alternative interpretation is that there 9 illegal "early" spilling days (**Fig**. 5)

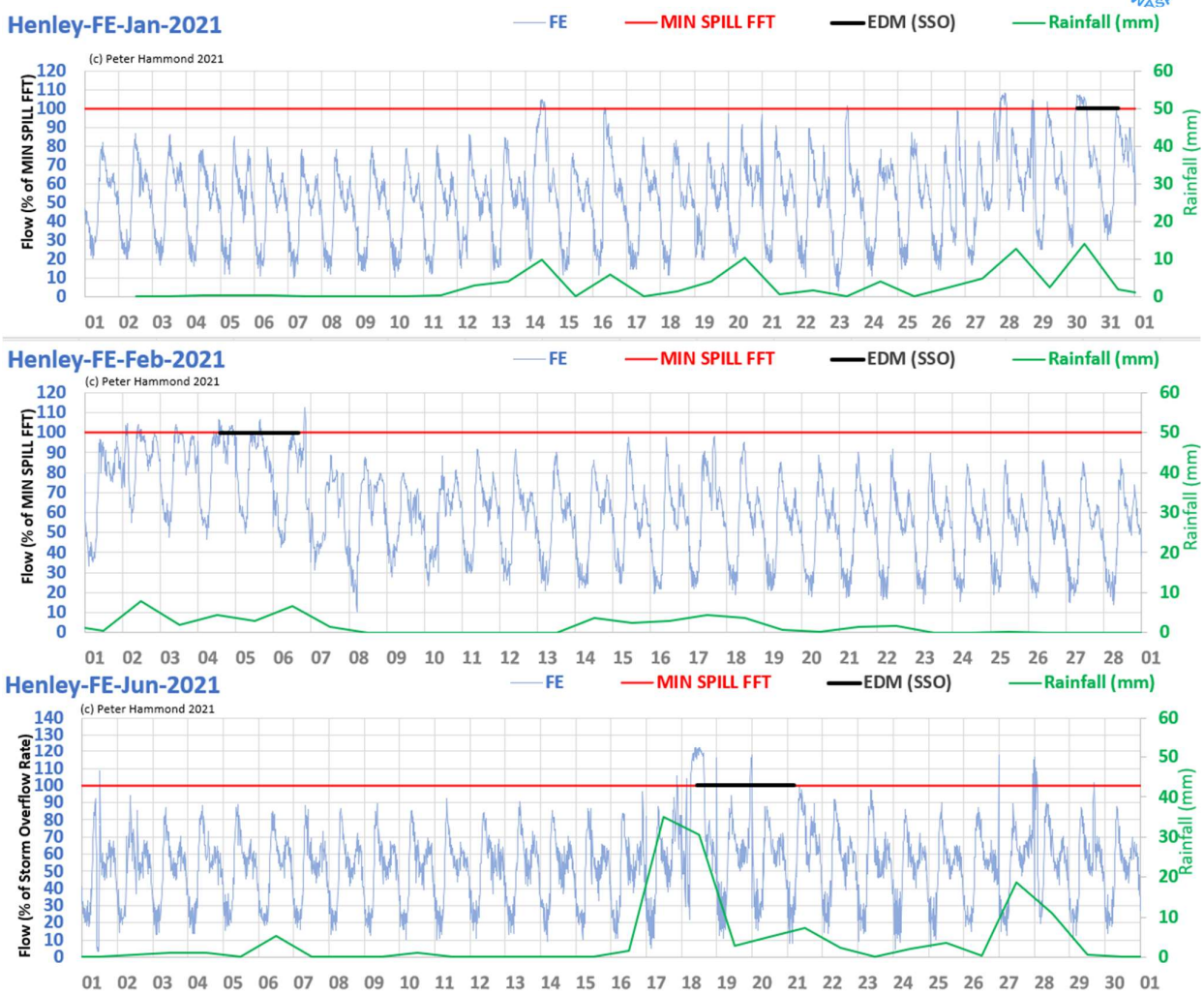


Figure 5: WASP believes the 9 spilling days indicated are not consistent with the flow data or are illegal

Woodstock STW – THAMES WATER (TW)

Woodstock STW discharges to the River Glyme which flows through lakes in the grounds of Blenheim Palace in Bladon and serves a population equivalent of 3,724. A longstanding problem with algal blooms in the lakes gave rise to a study in 2014 of the phosphate levels upstream and downstream of Woodstock STW[20]. The conclusion was that the STW made a major contribution to the algal bloom problem and Woodstock STW, because it is sited in a SSSI, was upgraded by the installation of phosphate stripping.

EDM SUBMISSION TO EA					WASP beliefs/facts
year	hours	spills	active	comments	
2018					
2019	27	3	20.00%	Data available between 04/06/19-16/08/19 due to comms issues. Poor data quality	600 spilling hours
2020	0	0	100.00%	Due to a calibration error, the 2020 data differs to the EA submission and will be corrected in our resubmission to the EA.	about 363 spilling hours
2021	916	52	95.07%		1 unreported spill

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Table 1: EDM annual summary spill data submitted to EA by Thames Water for Woodstock STW

TW reported 27 spilling hours to the EA for 2019. However, detailed EDM data provided by TW[21] contained no spills for 2019. WASP used the detailed EDM/sewage treatment data for 2021 and sewage treatment data for 2019 to estimate that Woodstock STW spilled for at least 600 hours in 2019.

TW reported 0 spilling hours to the EA for 2020. However, the detailed EDM data suggests there were 363 spilling hours. In its submission to the EA, TW mentioned a correction to be made but has yet to confirm.

TW reported 916 spilling hours to the EA for 2021. The 916 spilling hours is consistent with the detailed data analysed by WASP. However, WASP believes there was also an unreported spill in mid-May 2021 which was not investigated thoroughly by the EA, TW or an agent acting on behalf of TW.

2019

Aside from a malfunctioning EDM monitor at Woodstock STW and 27 spilling hours submitted by TW to the EA, WASP believes there were over 600 spilling hours in 2019, with most in November and December (**Fig**. 1).

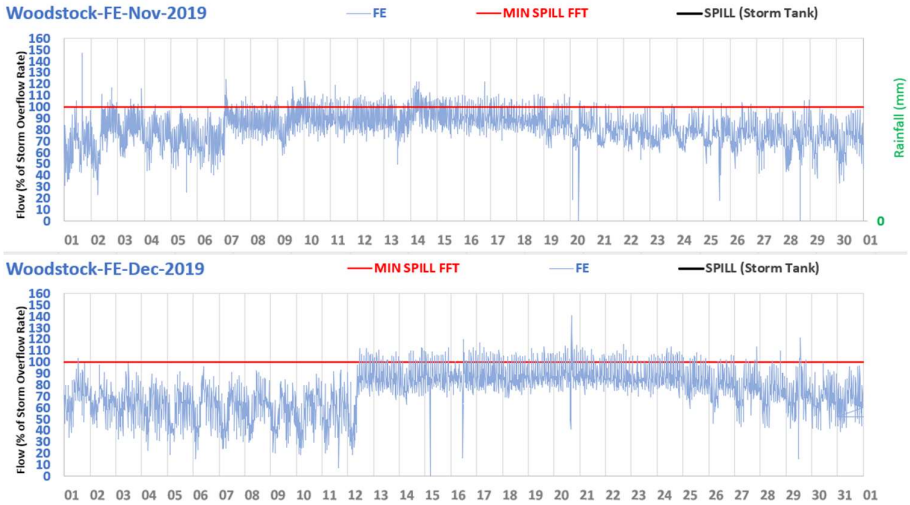


Figure 1: WASP's estimate of over 600 spilling hours in 2019 at Woodstock STW includes series of likely spilling days between October and December (e.g. Oct 26,27; Nov 7-19; Dec 12-24)

[20] https://www.blenheimpalace.com/parkmanagementplan/downloads/7184_R_Final_APPR_190315.pdf
[21] Detailed EDM data obtained from TW by Dr Richard Knowles covered installation to June 2021.

2020

In March 2021, TW's summary 2020 spill data submission to the EA for Woodstock STW was for 0 spilling hours. In June 2021, in response to an EIR request, TW provided detailed EDM spill data which is included in an overview chart (**Fig**. 2) along with sewage treatment flow data (FE), rainfall and River Glyme level. The different datasets appear to be mutually consistent. It is unclear why TW submitted 0 spilling hours to the EA in March 2021 but then when asked for detailed EDM spill data by Dr Richard Knowles, Chair of the Cotswold Rivers Trust, in May 2021 provided data in June 2021 suggesting over 360 spilling hours.

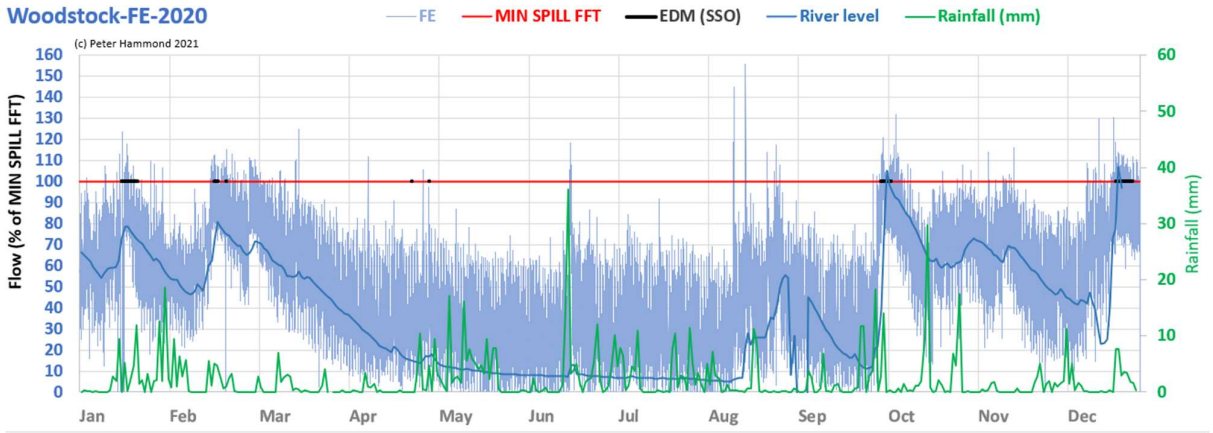


Figure 2: 2020 overview chart of sewage treatment, detailed EDM, rainfall and river level data for Woodstock STW

2021

For 2021, TW reported 916 spilling hours for Woodstock STW. **Fig**. 3 shows 764 spilling hours alone in January and February. This figure includes rainfall and the level of the River Glyme and dispels the myth that untreated sewage discharges are always diluted by swollen rivers.

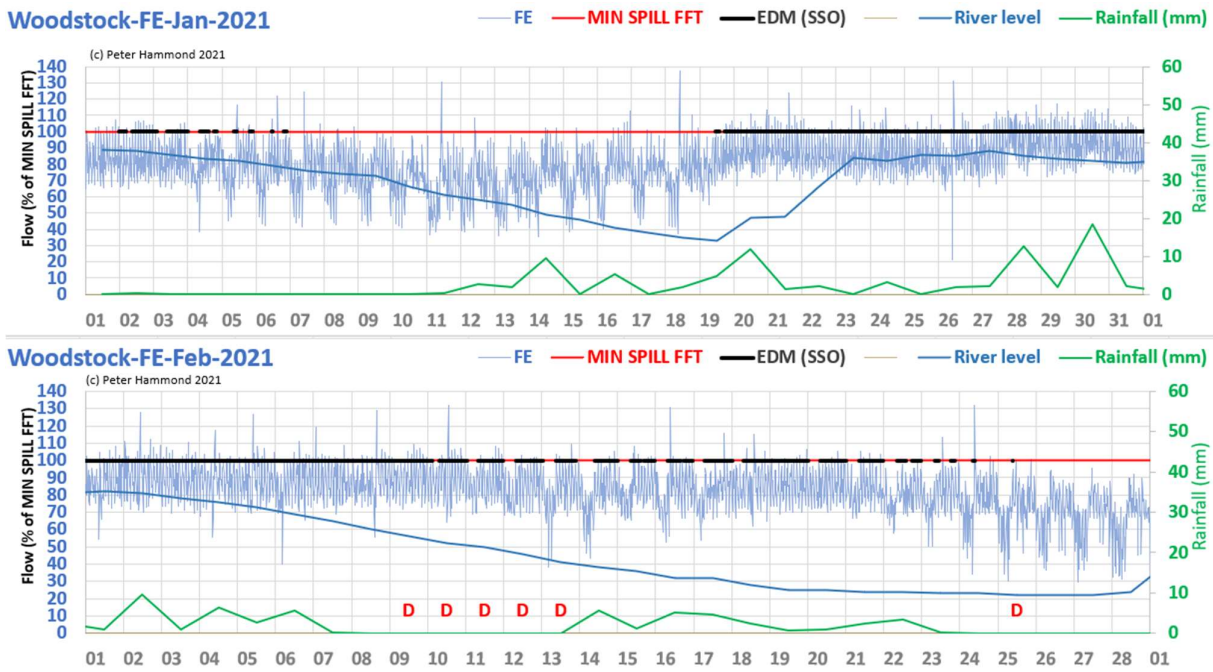


Figure 3: final treated effluent (FE) at Woodstock STW, local rainfall and River Glyme level for Jan and Feb 2021

WASP believes there was an unreported spill of untreated sewage in the middle of May. Sewage detritus was reported by a local resident a few days before WASP visited the River Glyme downstream of Woodstock STW on May 21st 2021. Sewage "rags" (sanitary products and wet wipes) were observed by WASP in bankside vegetation a few days earlier and the EA and TW were both alerted. TW requested a

third party to investigate but they were unable to find any evidence which is surprising as it was still clearly noticeable days after their attempted investigation, as was a COPASAC[22] that was retrieved from the river by WASP.

Fig. 4 shows the final treated effluent flow for Woodstock, local rainfall and level of the River Glyme.

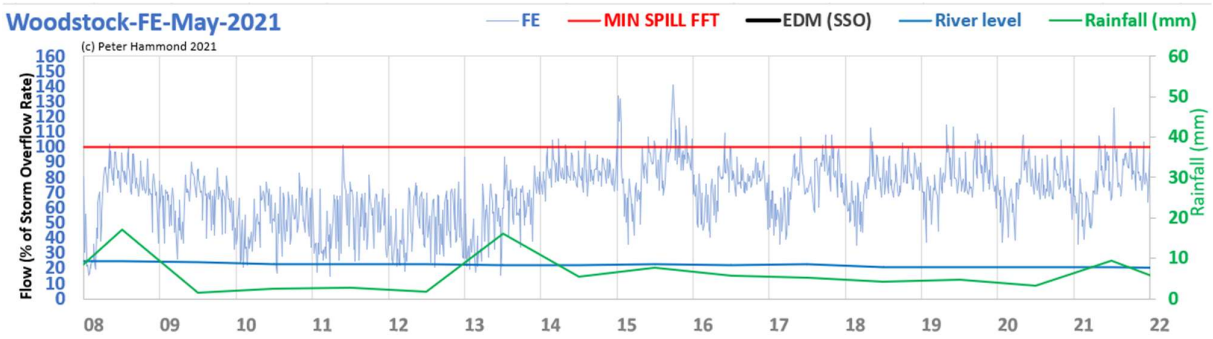


Figure 4: Final treated effluent flow for Woodstock STW, local rainfall and river level for part of May 2021

WASP believes the spill may have occurred on May 14th. Photographic evidence was recorded on location.

[22] A COPASAC is a meshed, cylindrical sack fixed to a storm overflow outlet that is meant to capture solid objects, condoms, sanitary products, wet wipes, ear buds etc. They can become full and either burst or detach themselves and flow downstream.

UNITED UTILITIES

Transparency and Openness

WASP's second report included analysis of several of UU's STWs dumping untreated sewage into the River Tame in the Manchester area. Rhys Blakely of the Times wrote an article[23] about the report and gave UU a right to reply in which UU said that the data WASP had employed was incorrect. WASP responded by pointing out that the data used was actually provided by UU. In return, UU explained in an email that it had since established more accurate data and that

> *"We have since manually cross-referenced the data from the event duration monitor on the Dukinfield storm tanks with other raw data on flows entering the storm tanks, however this is not in a format that can be readily shared"* United Utilities

UU's more accurate data has never been provided to WASP.

On April 27th 2022, through an EIR request, WASP asked UU to provide all individual spill start-stop times of its storm overflows. Eight of 10 WaSCs have provided the same data. UU refused the request on May 27th 2022 saying

> *"As you will be aware there is currently a national investigation by relevant regulatory authorities regarding discharges to the environment. We are still working with our regulators regarding the ongoing investigations and we note they are not necessarily restricted only to 2020 data. Therefore the information you have requested falls within the exception under Regulation 12(5)(b) of EIR which provides an exception to disclosure which could adversely affect the course of justice, the ability of a person to receive a fair trial or the ability of a public authority to conduct an enquiry of a criminal or disciplinary nature. As a result we will be unable to provide you with the information requested at this stage."* United Utilities

WASP requested an internal review of this decision on May 28th 2022. UU rejected the appeal on July 28th 2022.

More recently, in July 2022, WASP made an EIR request to UU for details of continuous measures of treated effluent data. UU refused the request, once again citing the EA investigation. WASP requested an internal review of this decision which UU has also rejected.

WASP intends to submit these cases to the Information Commissioner's Office.

Further examples of UU's refusal to provide data in response to EIR requests for storm overflows in the Lake District are catalogued in the analysis below.

In the EA's most recent Environment Performance Assessment, United utilities was given the highest 4* ranking which according to the EA means it is industry leading. Clearly, in terms of transparency and openness United Utilities is far from industry leading.

[23] https://www.thetimes.co.uk/article/britains-rivers-ruined-by-thousands-of-sewage-spills-x7pw2rwqz

Ambleside STW - United Utilities (UU)

Ambleside STW serves a population equivalent of almost 5,000 and spills to the River Rothay which flows into Lake Windermere.

WASP submitted an EIR request to UU on 28/02/2022 for detailed EDM and detailed sewage treatment data for 5 locations including Ambleside STW. A subset of the requested data was provided by UU two months later on 28/04/2022. The remainder has never been provided. Indeed, in response to a request from WASP for all detailed EDM spill data for all storm overflows for 2020 and 2021, UU refused to provide the data citing the Environment Agency investigation as an excuse.

EDM SUBMISSION TO EA					WASP beliefs/facts
year	hours	spills	active	comments	
2018	1,201	73	100.00%		15-min sewage flow meter failed Oct/Nov **22 illegal spilling days**
2019	1,176	68	99.85%		**15 illegal spilling days**
2020	1,719	100	99.99%		**data withheld** from WASP except for total daily volume (TDV) of treated sewage TDV & rainfall consistent with spill hours
2021	N/A	N/A	0%	Installation set-up/design issue N/A - Ongoing investigation	UU told EA there were N/A spilling hours UU told EA that EDM was never active UU gave WASP treatment & EDM data **annual spill was between 900 & 1300 hrs** **13 illegal spilling days**

Table 1: summary of data submitted by UU to the EA and brief details of analysis for Ambleside STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

2018

The 1,201 summary spilling hours submitted for Ambleside STW by UU to the EA for 2018 agrees with the detailed EDM data provided by UU to WASP. Figure 1 shows the annual chart for detailed EDM, detailed sewage treatment and rainfall.

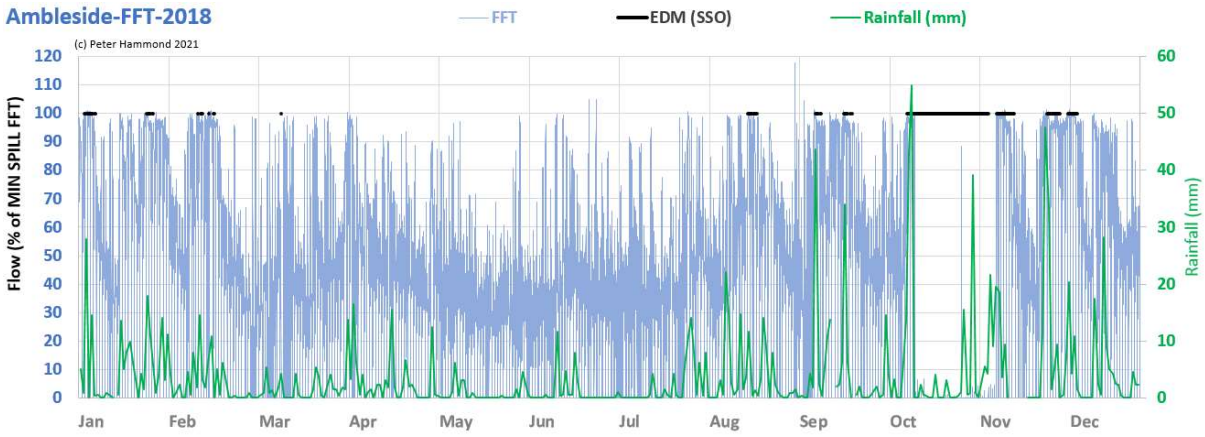


Figure 1: annual chart for detailed EDM, detailed treatment and rainfall for Ambleside STW for 2018

There was extreme rainfall on October 14th 2018 (Fig. 1) that appears to have damaged the meter that records sewage treatment flow (FFT) resulting in a wide data gap (October 16th to November 11th). WASP also obtained separate total daily volume data (TDV) from UU for sewage passed into the treatment process at the works. This appears to confirm that there was continued treatment during the gap (**Fig**. 2). Otherwise, such a gap would have corresponded to about 1.5 M litres of untreated sewage being discharged each day for 28 consecutive days. However, during much of the gap, the rate that sewage was treated was not sustained at the level prescribed in the EA permit for Ambleside STW. Therefore, WASP

believes that the works **spilled illegally every day for the 14 days between October 19th and November 2nd**.

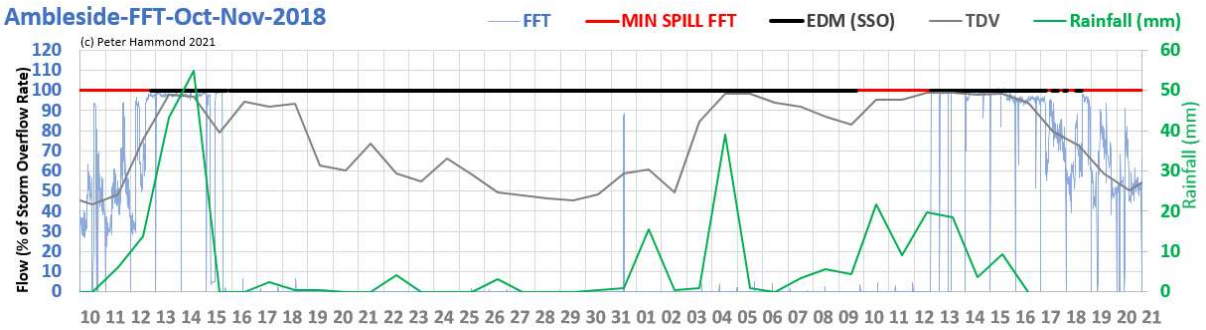


Figure 2: detailed sewage treatment, EDM and total daily volume (TDV) for Ambleside STV
WASP believes there were at least 14 days with illegal spills (Oct 19th to Nov 2nd)

There were additional days in 2018 when, during a spill, the sewage flow passed into the treatment process (FFT) was not sustained above the permitted minimum (**Fig**. 3). WASP believes that each of **the 8 days Jan 26th; Aug 20th,21st ,22nd; Sep 13th, 23rd; Nov 17th,18th included an illegal spill.**

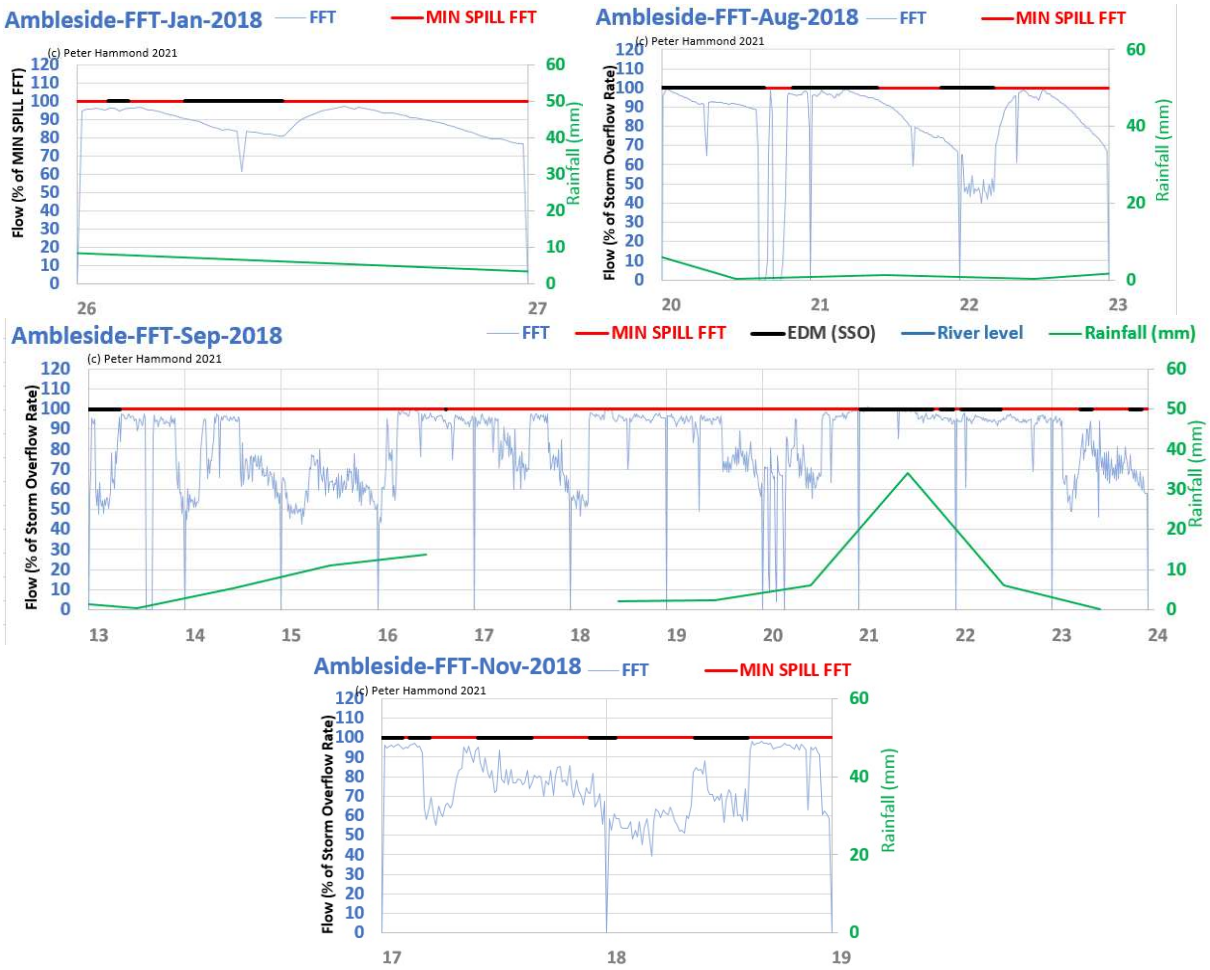


Figure 3 WASP believes there were illegal spills from Ambleside STW on Jan 26; Aug 20-22; Sep 13, 23; Nov 17-18

2019

The 1,176 summary spilling hours submitted for Ambleside STW by UU to the EA for 2019 agrees with the detailed EDM data and detailed treatment data provided by UU to WASP. **Fig**. 4 shows the annual overview chart for 2019 for detailed EDM, detailed sewage treatment and rainfall.

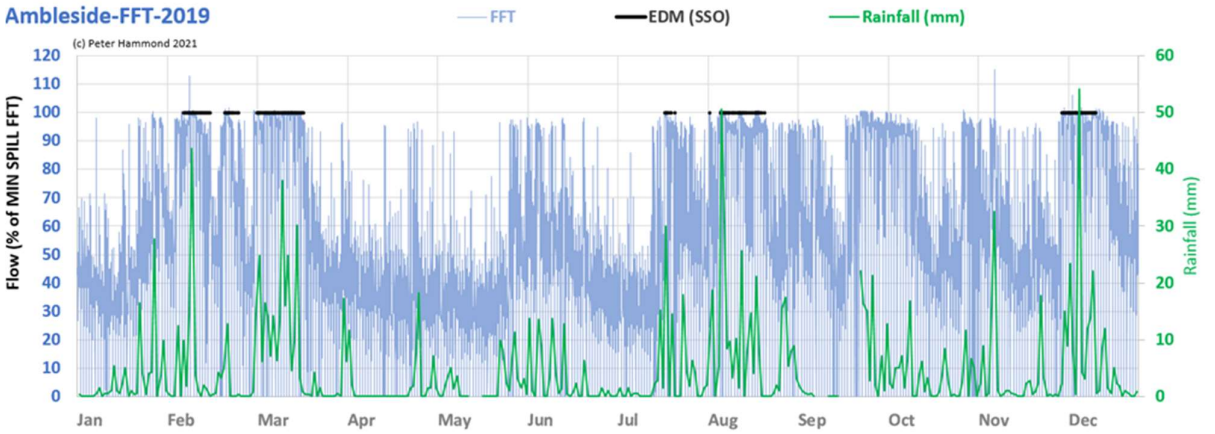


Figure 4: annual overview of detailed treatment and EDM spill data for Ely STW in 2019

WASP believes there were illegal spills on 15 days: Feb 12-15; Mar 18; Jul 23-25; Aug 16, 19-21 (**Fig**. 5).

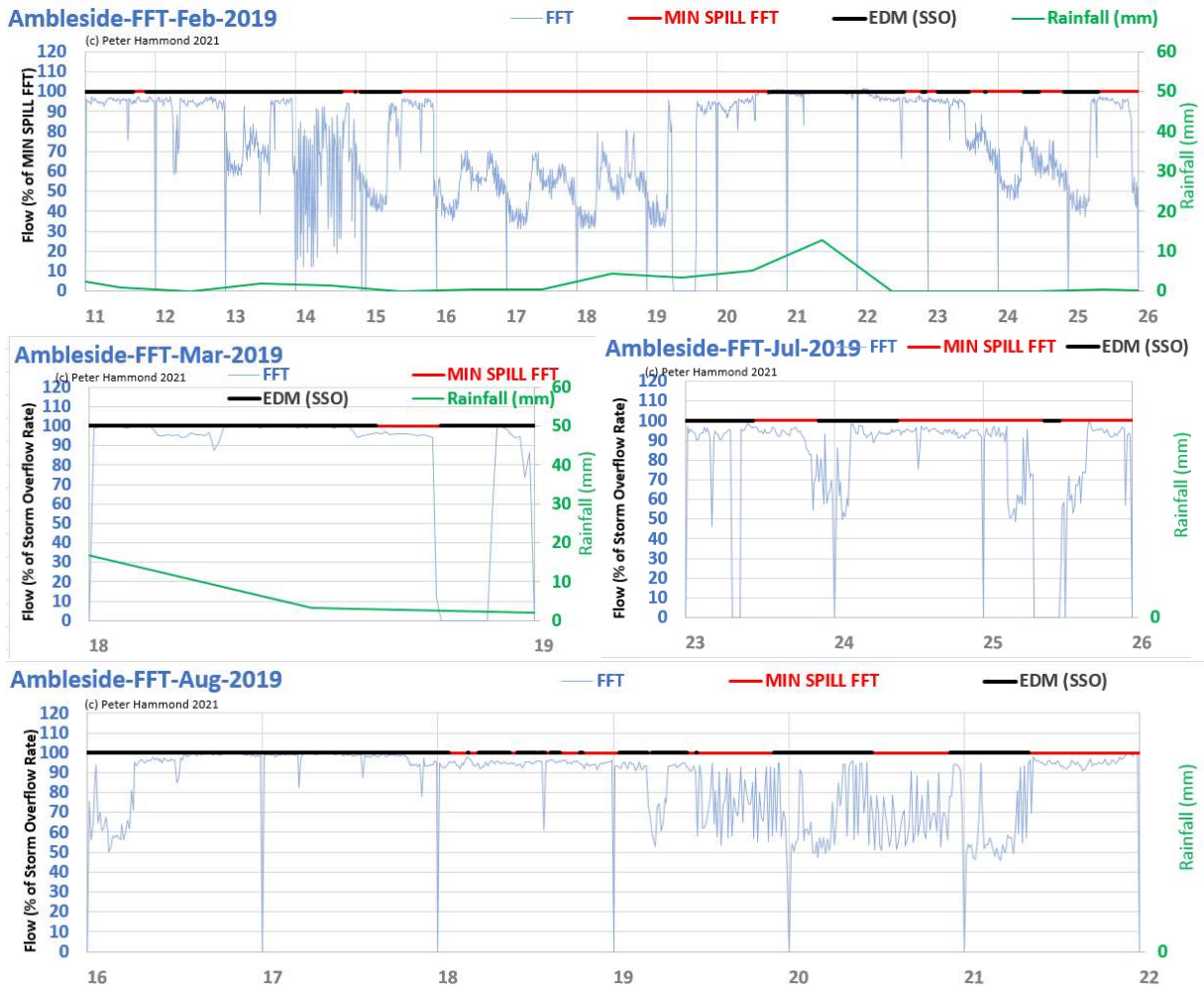


Figure 5: WASP believes there were illegal spills from Ambleside STW on 15 days in 2019

2020

UU refused to provide WASP with detailed EDM and detailed sewage treatment data for 2020 for Ambleside STW, citing the investigation by the EA announced in November 2021. UU did however provide total daily volume (TDV) sewage treatment data for 2020. The overview chart (**Fig**. 6) shows TDV and rainfall data for 2020. WASP has estimated the spills to be equivalent to 71 or so full days (1,704 hrs) which is reasonably consistent with the 1,719 hrs submitted by UU to the EA.

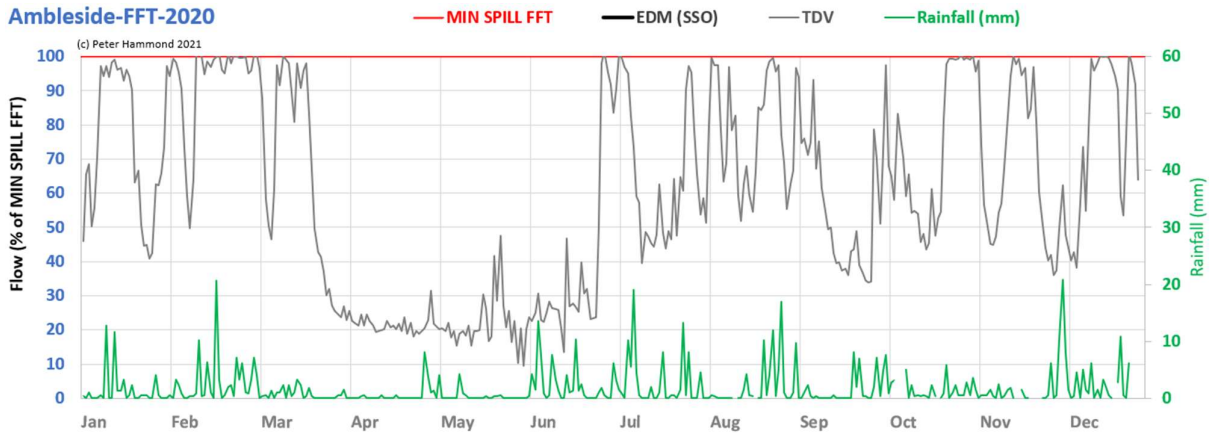


Figure 6: annual overview of rainfall and total daily volume of treated sewage at Ambleside STW for 2020

Without the detailed EDM and detailed sewage treatment data, it is not possible to check reliability of the data UU submitted to the EA nor compliance of the spills with the EA permit for Ambleside STW.

2021

UU's 2021 spill submission to the EA for Ambleside was unusual. Firstly, UU did not provide the number of spilling hours but entered "N/A" without any further explanation. UU also declared 0% EDM monitor activity and an "installation" issue. However, UU did provide detailed EDM SPILL data to WASP that looks intermittently consistent with rainfall data and the detailed flow and data.

As with 2018 and 2019, there are occasions where the detailed spill data for 2021 suggest there are illegal spills. An alternative, and a generous interpretation of these occasions, would be to suggest that the EDM monitor made an error and occasionally identified some ***false positives***. Even if this approach is taken, WASP believes the remaining spills amount to more than 900 spilling hours.

Another alternative, but much less generous, approach is to assume correctness of the detailed EDM spill data provided by UU to WASP and in addition interpret some periods when "flattened" regions of the detailed sewage treatment data suggest there may have been spills not detected by the EDM device that could be interpreted as ***false negatives***. If this second alternative approach is taken, then the total spilling hours could be as much as 1,300 hours.

Fig. 7 shows the detailed EDM and detailed sewage treatment data for 2021 for Ambleside STW with annotations identifying where there may be false positives and false negatives.

Therefore, WASP believes that the detailed treatment and detailed EDM data provided by UU to WASP correspond to between 900 and 1300 spilling hours in 2021 at Ambleside STW.

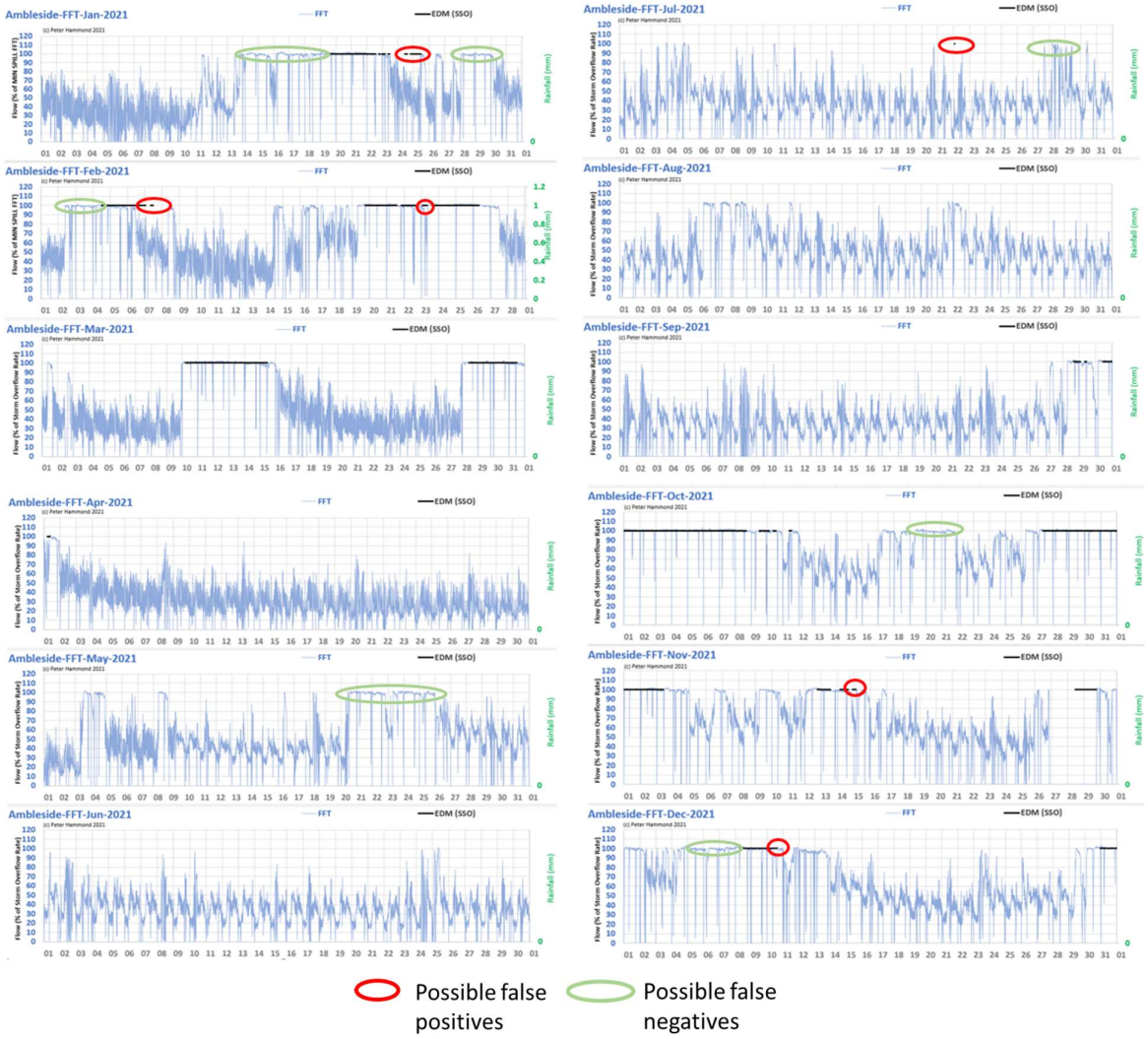


Figure 7: Detailed EDM and detailed sewage treatment data for Ambleside STW for 2021 with annotations identifying regions where the EDM device may have made false positive or false negative detections of spills

If the EDM data are correct then WASP believes there were 13 illegal spilling days at Ambleside in 2021 (**Fig**. 8).

Coniston STW - United Utilities (UU)
Coniston is a small sewage works serving a population of about 740. It discharges to the Church Beck which flows into Coniston Water.

year	hours	spills	active	United Utilities - comments	WASP beliefs/comments
2018	3,147	168	100%		either EDM unreliable or many illegal spills
2019	3,516	180	100%		19 days included illegal spills
2020	5,551	230	99.65%		EDM data unreliable
2021	2,710	138	100%	Not asset maintenance - Hydraulic capacity N/A - Ongoing investigation	

Table 1: EDM annual summary spill data submitted to EA by United Utilities for Coniston STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

2018
UU submitted a summary EDM spilling total of 3,147 hours. This figure looks unreliable largely because of inconsistencies between detailed sewage treatment data, rainfall data and the detailed EDM data provided by UU to WASP. If the detailed EDM data were assumed to be reliable then it would then be necessary to infer that there are many illegal spills occurring. Illustrative examples are shown in **Fig**. 1 .

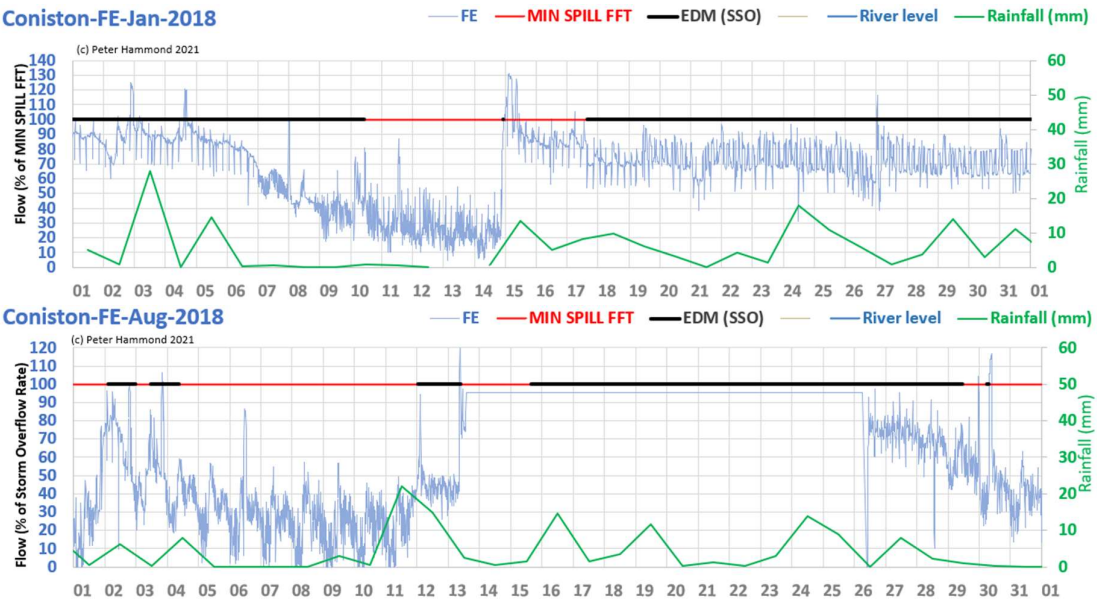


Figure 1: Detailed charts for Jan & Aug 2018 at Coniston STW where either the EDM is unreliable and has produced false positives or it is correct and some spilling days are illegal (Jan 8-10; Aug 4,12-13,30)

In **Fig**. 1, the last 3 days of the 10-day spill at the beginning of January are either false positives, given the lack of rainfall and shape of the effluent flow curve, or if the EDM spill data are reliable then these 3 days involve doubly illegal spills due to lack of rain and treatment around 40% of works capacity. In contrast, WASP believes Aug 12th/13th involved a valid but illegal early spill. If all of the detailed spill data that UU supplied to WASP were to be assumed reliable then WASP believes more than 25 days involved illegal spills. Either the detailed EDM spill data UU supplied to WASP is unreliable or there were many illegal spills throughout the year. Given the analysis shown below for 2019, WASP is inclined to believe the former.

2019
The summary 3,516 spilling hours submitted by UU to the EA is consistent with the detailed EDM data provided by UU to WASP. Moreover, compared to 2018, the detailed EDM data looks consistent with the detailed flow and rainfall data and so WASP believes the 2019 EDM submission by UU is reliable (**Fig**. 2).

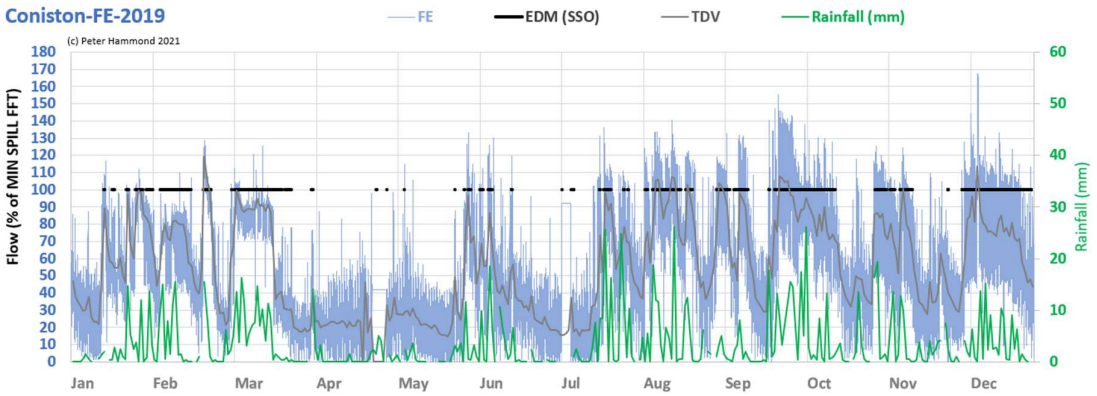


Figure 2: 2019 overview of detailed final effluent, detailed EDM, rainfall and total daily flow for Coniston STW

A consequence is that WASP also believes there were illegal spills on at least 19 days.

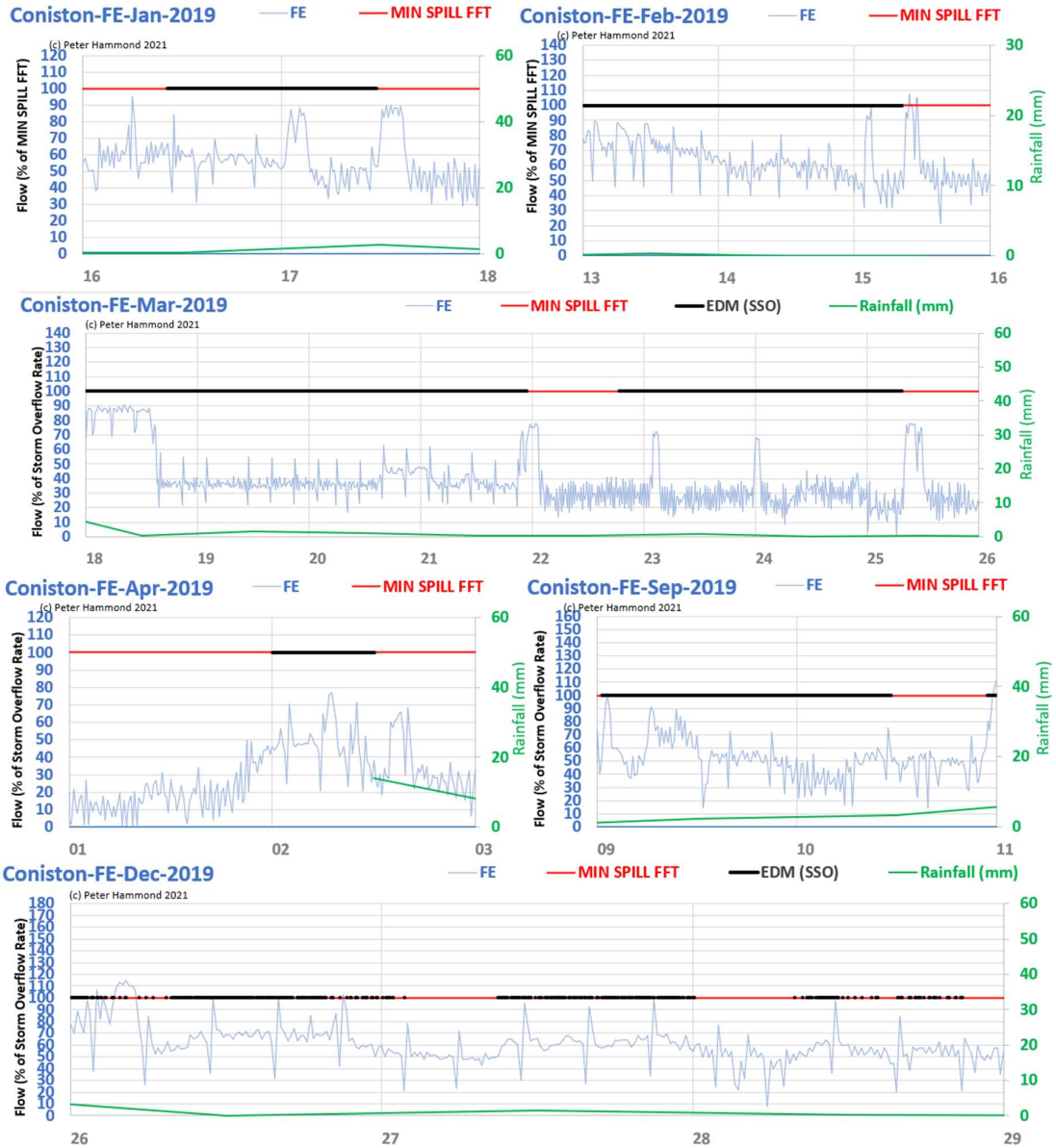


Figure 3: WASP believes there were 19 illegal spills on the following days: Jan 16-17; Feb 13-15; Mar 18-25; Apr 2; Sep 9-10; Dec 26-28

2020

UU submitted summary EDM data of 5,551 spilling hours during 230 spills. This suggests an average spill length of about 24hrs for a 9 month period. UU refused to provide WASP with detailed EDM and detailed sewage treatment data for 2020 but did provide total daily flow (TDV). An average spill length of 24 hrs and the TDV curve (**Fig**. 4) look inconsistent so WASP believes the spill data submitted to the EA is unreliable.

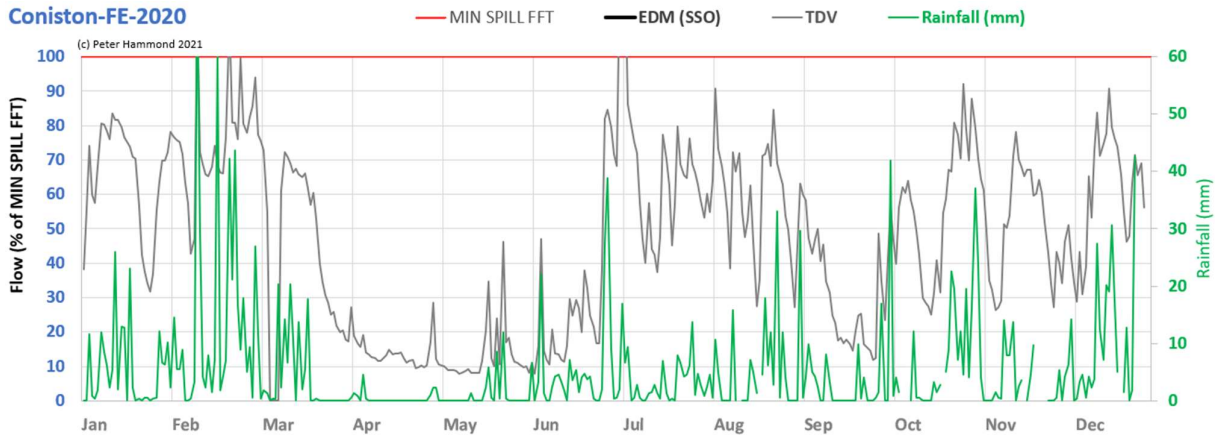


Figure 4: 2020 summary chart for total daily volume (TDV) and rainfall for Coniston STW

2021

The summary EDM spilling hours of 2710 submitted by UU to the EA are consistent with the detailed EDM spill data that UU provided to WASP (**Fig**. 5) in the first six months of the year but in the second half of the year they appear less consistent. Therefore, as with 2018, either the EDM data is not entirely reliable or there are illegal spills in the second half of the year.

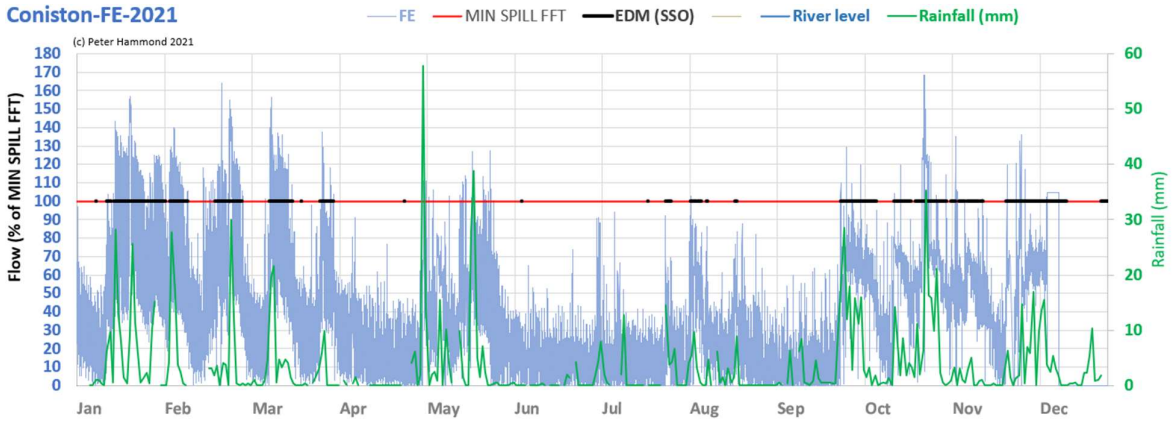


Figure 5: 2021 summary chart for detailed treatment, detailed EDM and rainfall for Coniston STW

Hawkshead Pumping Station – UNITED UTILITIES (UU)

EDM SUBMISSION TO EA					WASP beliefs/facts
year	hours	spills	active	comments	
2018	1,283	197	100.00%		at least 34 illegal spilling days
2019	2,517	221	100.00%		at least 37 illegal spilling days
2020	2,475	117	100.00%		
2021	1,372				

Table 1: summary of data submitted by UU to the EA and brief details of analysis for Hawkshead Pumping Station

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Hawkshead STW does not have a storm discharge permit but the feeder Hawkshead Pumping Station (PS) does. Hawkshead PS's permit has not changed since 2011 and requires a minimum sewage flow of 14 l/s to be achieved before excess can be diverted to or overflow from its storm tank to the Black Beck. Black Beck feeds Eshwaite Water from which Cunsey Beck flows for about 2 miles before entering Lake Windermere. Although the discharge from Hawkshead is to not directly to Cunsey Beck, its level is a useful indicator of local rainfall.

A report[24] from 2011 documents decades of issues with phosphate levels in Esthwaite Water and upgrades to both the Hawkshead STW and feeder Hawskhead PS to reduce phosphate levels. The latter was planned to be upgraded in 2011/2012 which appears to coincide with amendments to its permit.

2018

Although UU submitted summary spill data of 1,283 hours to the EA for 2018, the detailed spill start-stop times were withheld and not provided in response to WASP's EIR request. No excuse or explanation for this was provided unlike for the withholding of 2020 data. Indeed, sewage flow at Hawkshead PS was provided as requested. The 2018 overview chart is shown in **Fig**. 1.

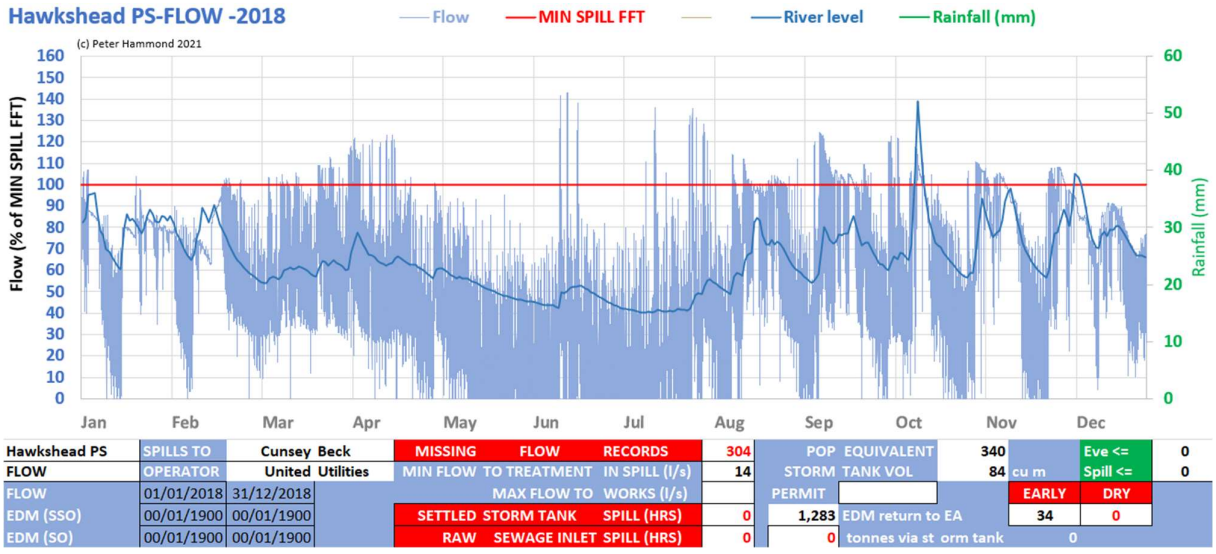


Figure 1: 2018 overview of flow at Hawkshead Pumping Station as well as Cunsey Beck level

Without the detailed start-stop times for Hawkshead PS, WASP has estimated that the number of spills submitted to the EA appears to be consistent with the sewage flow, rainfall and river level data. In terms of illegal spilling days, WASP believes there were at least 34 "early" spills when flow through the Hawkshead PS had not reached or was not sustained at a level as required by its permit. Some of these are illustrated in **Fig**. 2.

[24] https://nora.nerc.ac.uk/id/eprint/15008/2/N015008CR.pdf

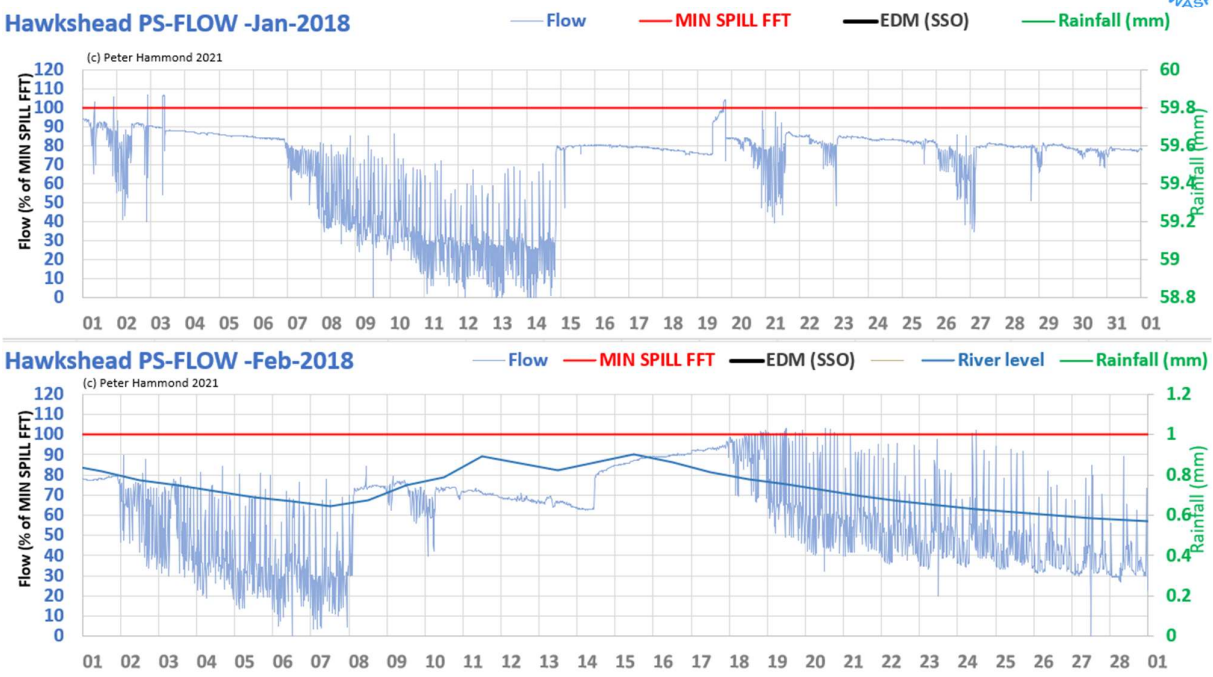


Figure 2: WASP believes there were at least 25 illegal spilling days at Hawkshead PS in Jan/Feb 2018 (Jan 3-6,15-19, 23-25,27-31; Feb 8-15)

2019

Although the detailed spill start-stop times obtained from UU via EIR request give rise to a total matching the summary spilling hours submitted to the EA, they are not always consistent with the sewage flow, Cunsey Beck level and daily rainfall.

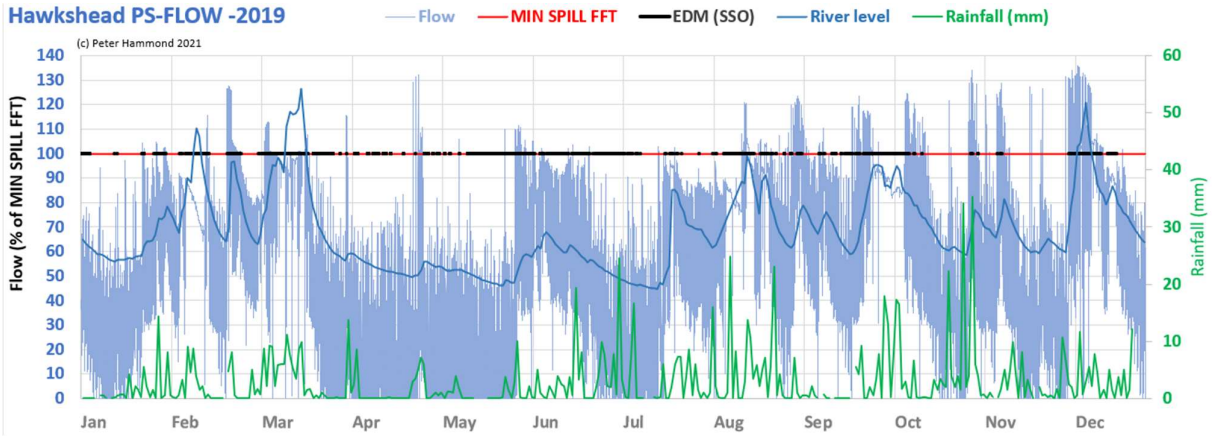


Figure 3: 2019 overview of flow at Hawkshead Pumping Station plus rainfall and level of Cunsey Beck

The inconsistency is demonstrable at a more detailed level in the monthly charts for April and May 2019 as shown in **Fig**. 4.

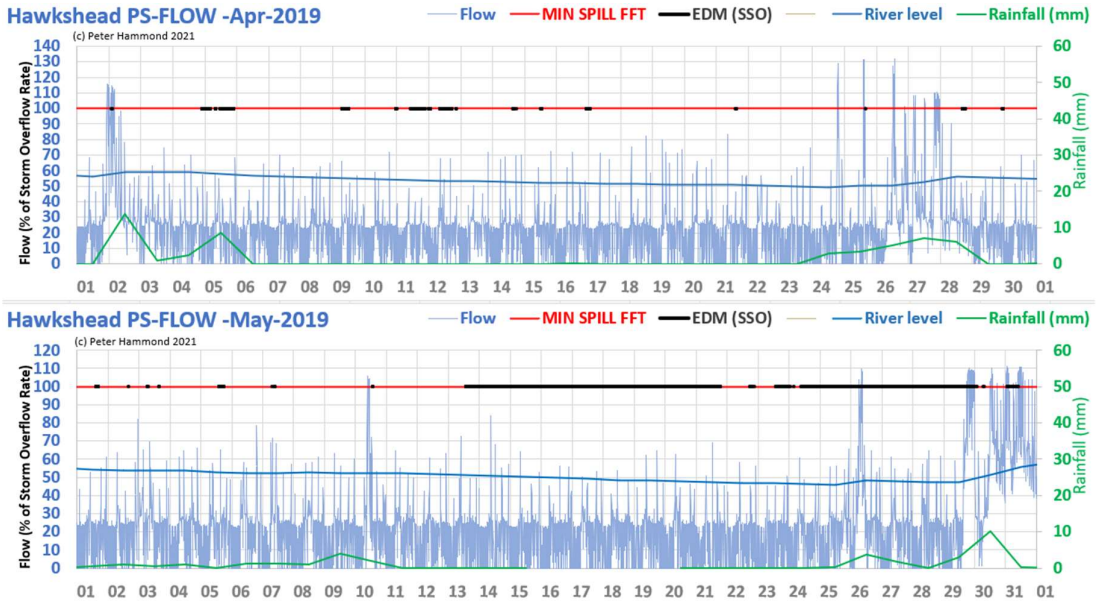


Figure 4: WASP believes the 2019 April and March charts for Hawkshead PS illustrate EDM unreliability

However, there are times when the detailed spill data are quite consistent with flow and rainfall data as demonstrated in **Fig**. 5 which WASP believes suggests there were 37 illegal spilling days.

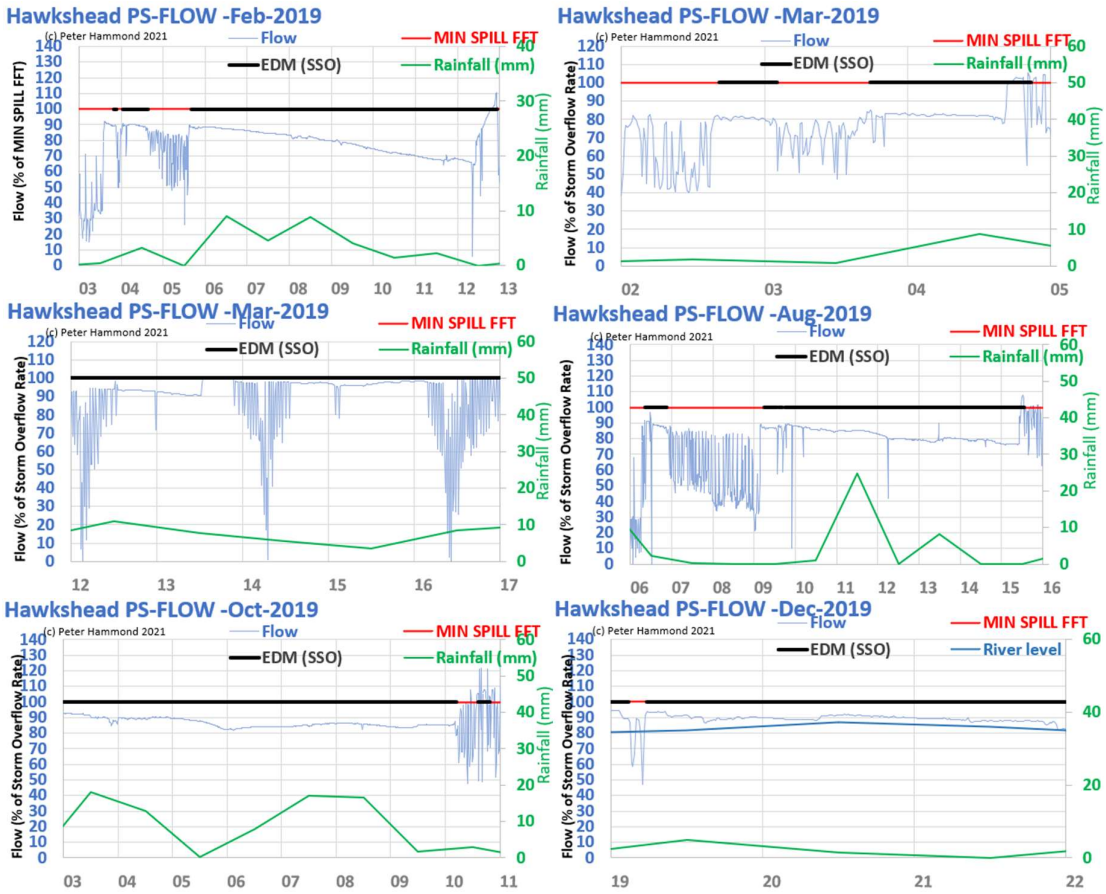


Figure 5: WASP believes there were 37 illegal spilling days at Hawkshead PS in 2019 (Feb 3-12; Mar 2-4, 12-14, 16; Aug 6, 9-15; Oct 3-11; Dec 19-21)

2021

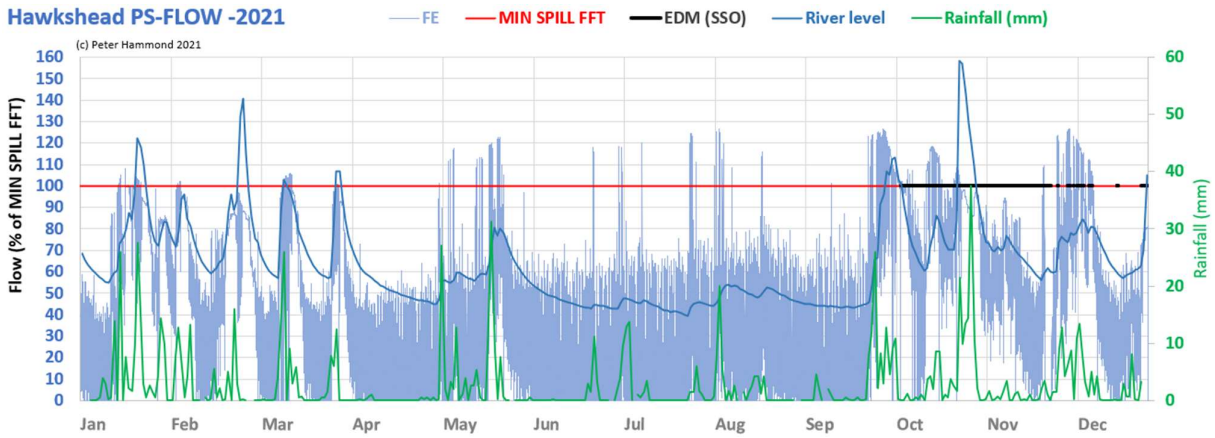


Figure 6: WASP believes the 2021 overview for Hawkshead PS show unreliable EDM detection in the latter quarter

The detailed spill start-stop times provided to WASP for 2021 suggest that spills only occurred in the latter quarter of the year (**Fig**. 6). The summary spilling hours provided to the EA for 2021 (1,372 hours) matches the sum of the lengths of the individual spills reported to WASP. However, WASP believes that based on the combination of sewage flow and rainfall data, some of the indicated spills are false positives and that in the first quarter of 2021, there were many days when spills occurred that have gone unreported. These unreported spills, WASP believes, could amount to more than 300 hours.

For example, the charts below for October and November (Fig. 7)show the EDM data to be unreliable but reliable for December. The danger is that good data is thrown out with bad.

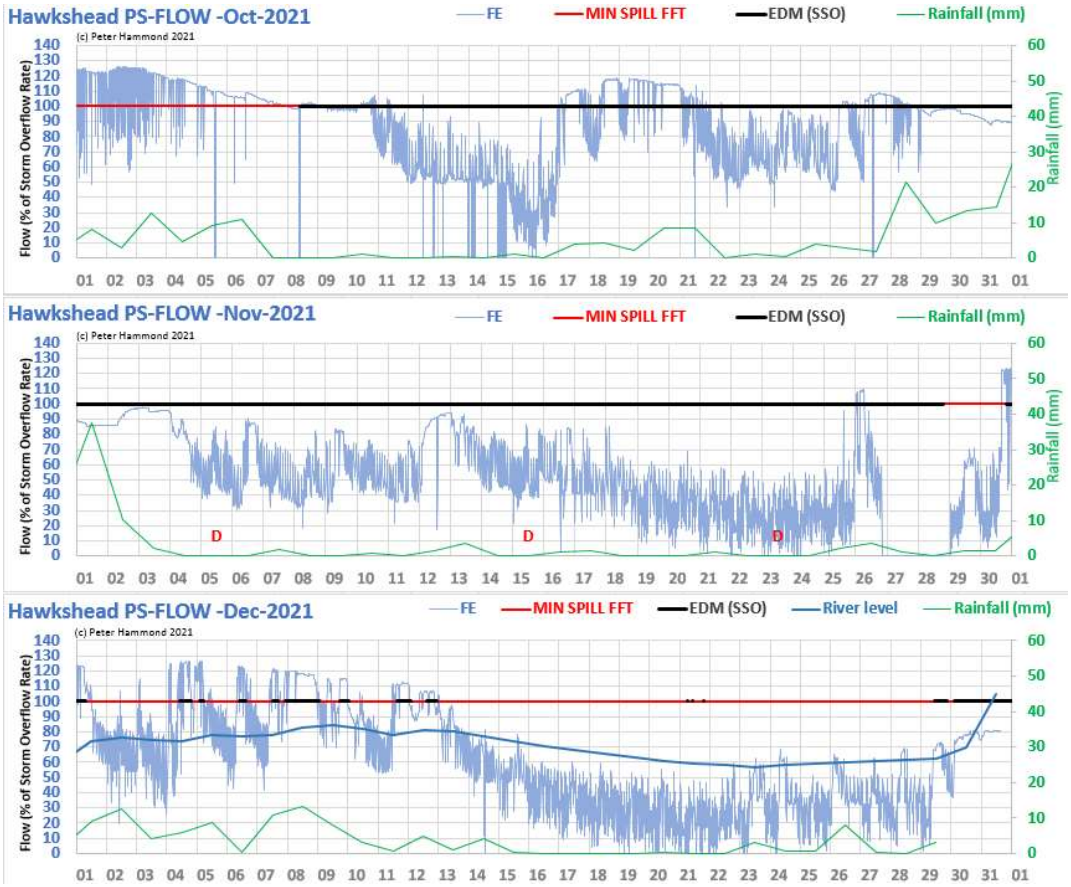


Figure 7: WASP believes spills detected in Oct and Nov 2021 are unreliable in contrast to those in Dec

Near Sawrey STW – UNITED UTILITIES (UU)

Near Sawrey STW serves a population equivalent of about 600. It discharges to the Black/Cunsey Beck which flows for around two miles between Esthwaite Water and Lake Windermere. In the summer of 2022, Cunsey Beck suffered a serious pollution incident[25] that killed 200 fish (trout, salmon, pike), eels and white-clawed crayfish. The cause is thought to be sewage pollution but the Environment Agency has yet to publish results of its investigation.

year	hours	spills	active	comments	WASP beliefs/comments
2018	1,177	254	99.00%		
2019	2,222	108	99.97%		20 illegal spilling days
2020	2,059	113	99.97%		
2021	1,459	82	98.90%		23 illegal spilling days

Table 1: EDM annual summary spill data submitted to EA by United Utilities for Near Sawrey STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

2021

The 2021 summary chart of final treated effluent flow (FE), rainfall, spill and Cunsey Beck level data is shown in **Fig**. 1. The summary spilling hours submitted by UU to the EA differs slightly (26 hours larger) from the detailed spill data provided by UU to WASP. Despite the storm tank at Near Sawrey STW being more than six times larger than the EA requirement and the works capacity being approximately 7 times the dry weather flow (rather than the classical 3), Near Sawrey suffers considerable spilling of untreated sewage.

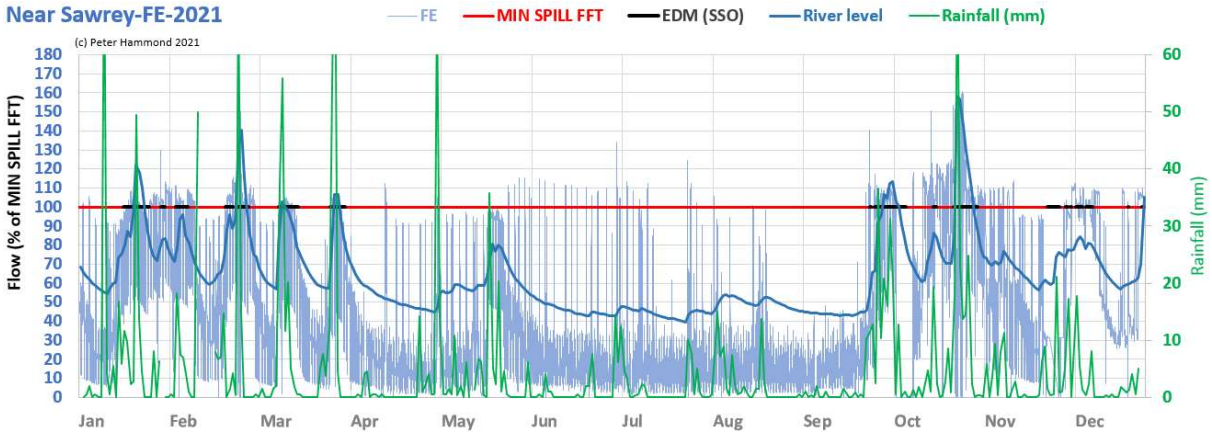


Figure 1: 2021 overview chart for Near Sawrey showing STW effluent flow, rainfall, spills and Cunsey Beck level

WASP believes there were 4 days with illegal "dry" spills (**Fig**. 2) and 19 days with illegal "early" spills from Near Sawrey STW in 2021 (**Fig**. 3).

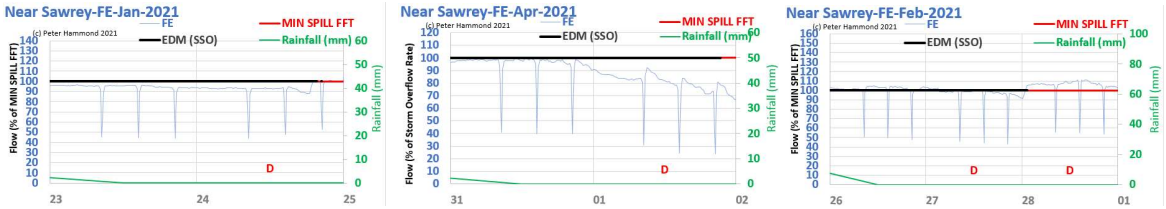


Figure 2: WASP believes there 4 illegal "dry" spilling days at Near Sawrey STW (Jan 24; Feb 27,28; April 1)

[25] https://cumbriacrack.com/2022/07/11/claims-untreated-sewage-killed-200-fish-in-lake-district-beck/

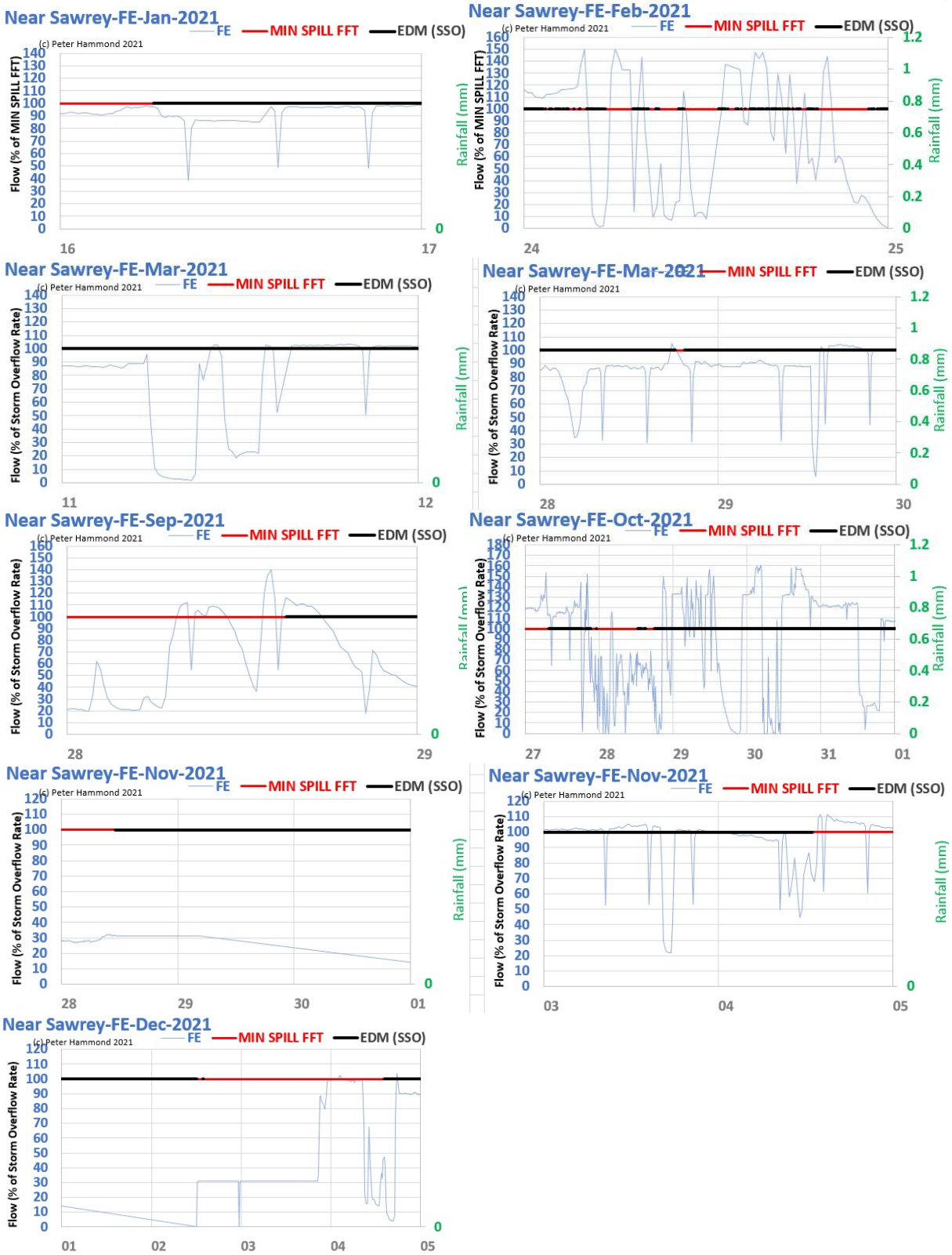


Figure 3: WASP believes there were 19 illegal "early" spilling days at Near Sawrey STW (Jan 16; Feb 24; March 11,28,29; Sep 28; Oct 27-31; Nov3-4, 28-30; Dec 1,2,4)

2020

UU withheld the 2020 sewage treatment and spill data. However, UU did provide TDV (total daily volume) for treated sewage. The 2020 overview chart (Fig. 4) for Near Sawrey STW shows TDV plotted alongside rainfall and Cunsey Beck level data. For Near Sawrey STW, UU submitted a total of 2,059 spilling hours for 2020.

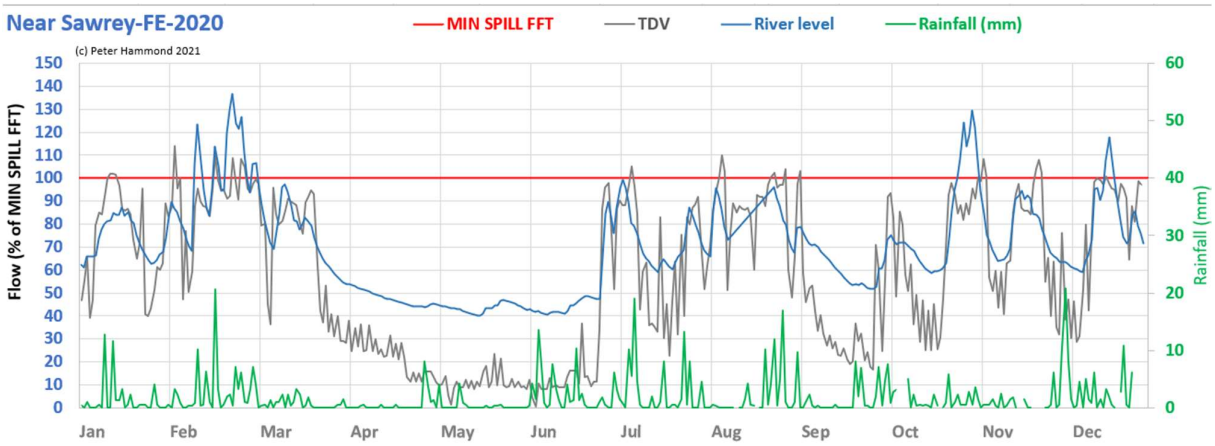


Figure 4: 2020 overview of TDV (total daily sewage treatment volume), rainfall and Cunsey Beck level

Without the detailed spill data, it is not possible to comment further.

2019

The 2019 overview chart for Near Sawrey STW (Fig. 50) suggests the summary data submitted by UU to the EA to be consistent with the sewage treatment, detailed spill, rainfall and Cunsey Beck level data.

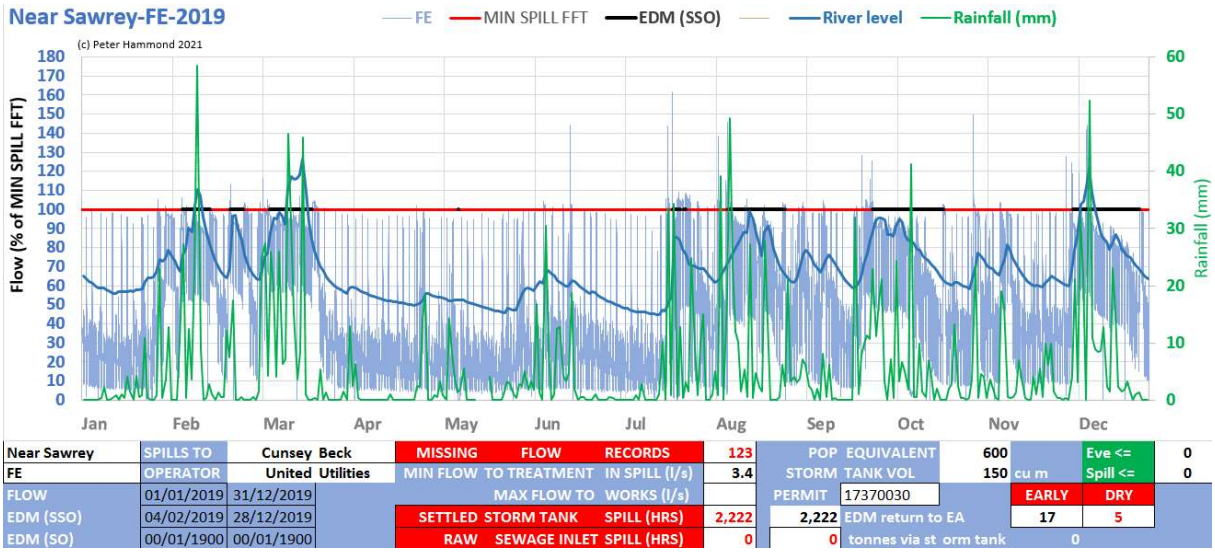


Figure 5: 2021 overview chart for Near Sawrey showing STW effluent flow, rainfall, spills and Cunsey Beck level

The consistency is further confirmed by analysis of the monthly charts for Near Sawrey and WASP believes there were at least 20 illegal spilling days in 2019 (**Fig**. 6). Those days where WASP believes there were spills considered both “dry” and “early” are not double counted in the total for the year.

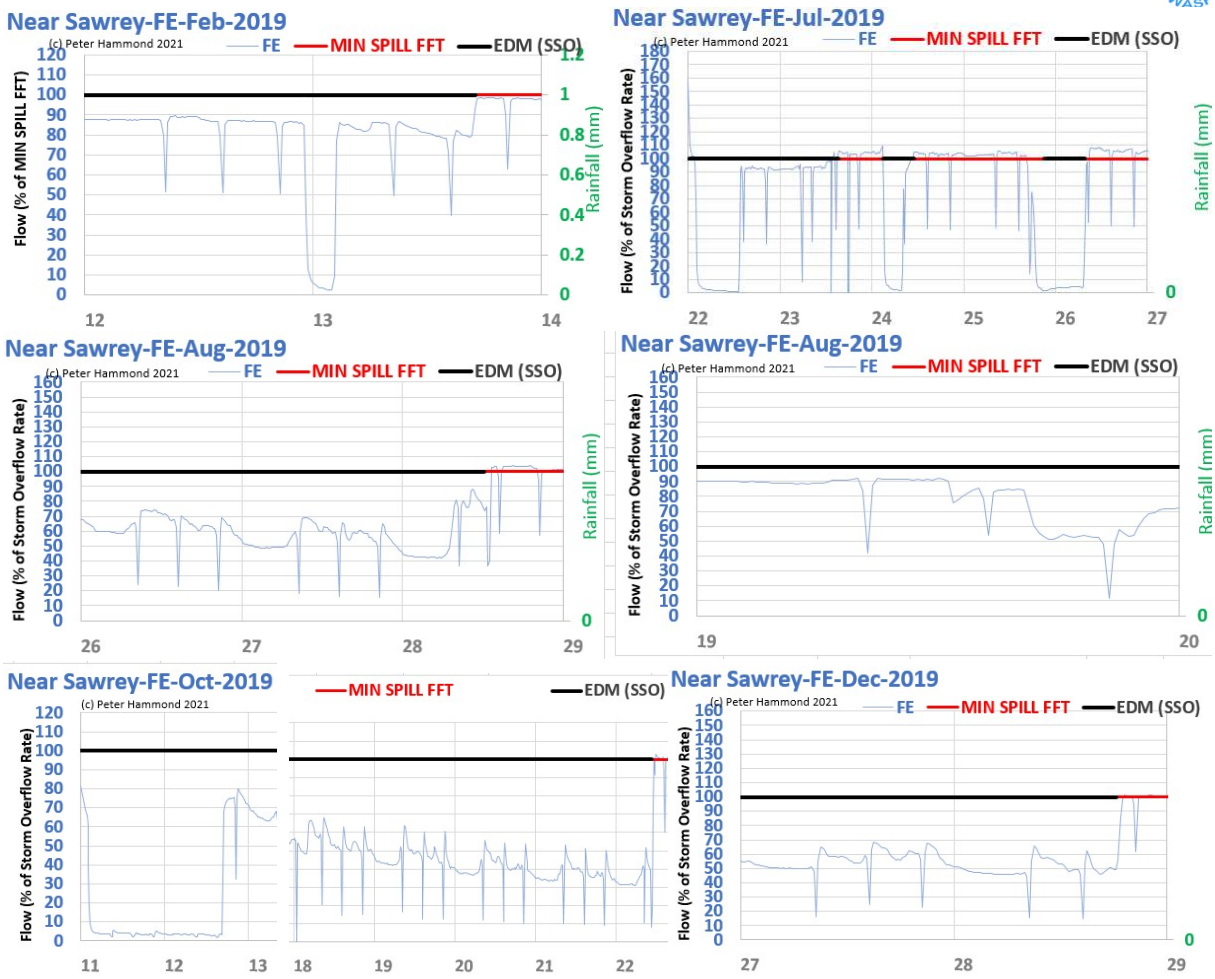


Figure 6: WASP believes there were at least 20 illegal spilling days in 2019 at Near Sawrey STW (Feb 12-13; Jul 22-24, 25-26; Aug 19-20, 26-28; Oct 11-12, 19-22, 27-28)

2018

Although the 2018 summary spilling hours submitted to the EA by UU for Near Sawrey STW agree with the total derived from the detailed spill data supplied by UU to WASP, the overview chart (**Fig**. 7) suggests that there are periods where the detailed spill data is quite inconsistent with sewage treatment (FE) and Cunsey Beck levels (reflecting rainfall).

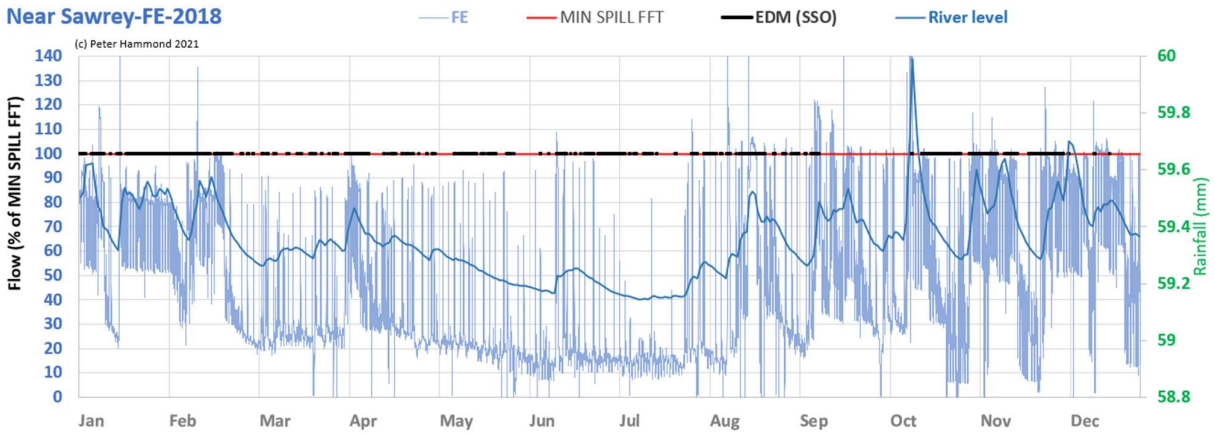


Figure 7: 2018 overview of FE (final effluent), detailed spill and Cunsey Beck level data for Near Sawrey STW

The monthly charts for show this more clearly (**Fig**. 8).

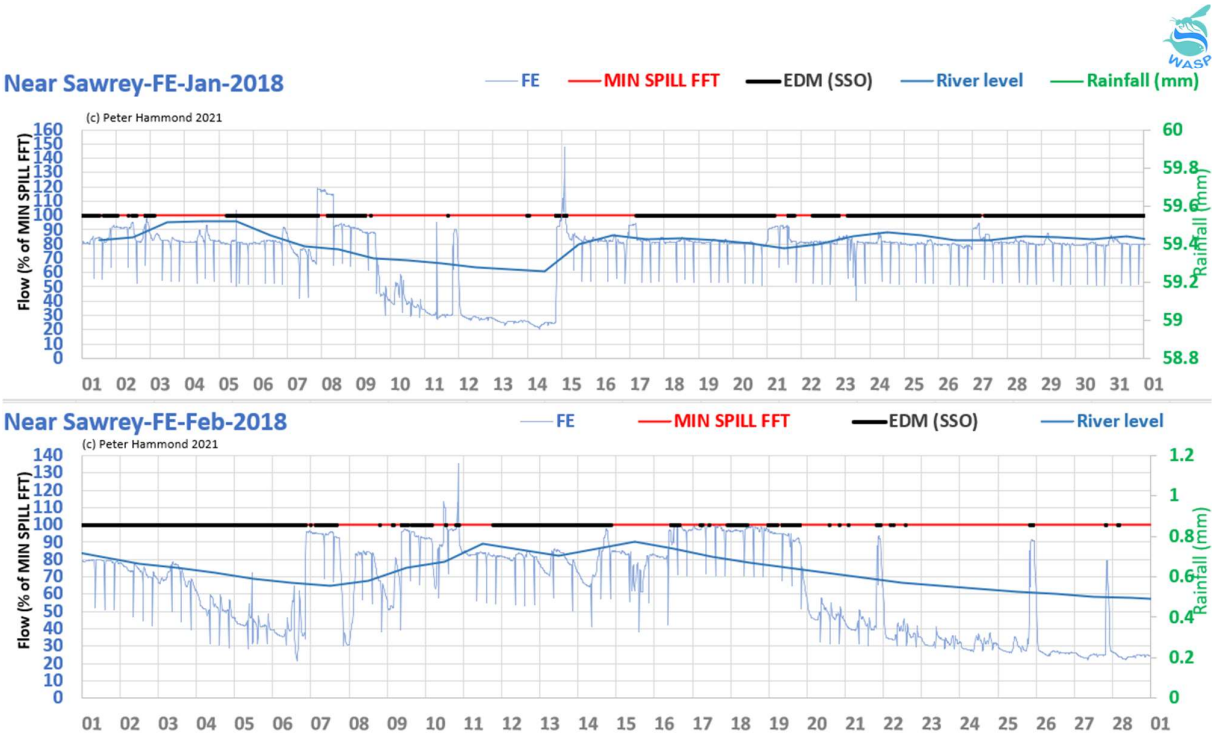


Figure 8: WASP believes the Jan 2018 chart suggests consistency between sewage treatment and spills whereas that for Feb involves inconsistency or several illegal "early" spilling days (e.g. Feb 5-6)

Builth Wells STW - DCWW

EDM SUBMISSION TO EA					WASP beliefs/facts
year	hours	spills	active	comments	
2018					at least 1600 spilling hours at least 10 illegal spilling days
2019					at least 1600 spilling hours at least 15 illegal spilling days
2020	1,483	122	88.80%		at least 300 hours in Jan'20 before EDM commissioning at least 50 illegal spilling days
2021	1,181	96	99.92%		at least 23 illegal spilling days

Table 1: summary of data submitted by Welsh Water to the EA and brief details of analysis for Builth Wells STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Builth Wells STW serves a population equivalent of about 4,000 and discharges to the River Wye. For 2020, there is a discrepancy between the summary spilling hours reported to the NRW for Builth Wells (1,483) and the total spilling hours (1,502) derived from detailed spill data given to WASP by Welsh Water.

2021

In Oct-Nov 2021, the sewage spills were compliant (**Fig**. 1) apart from an illegal dry spill on Dec 22nd.

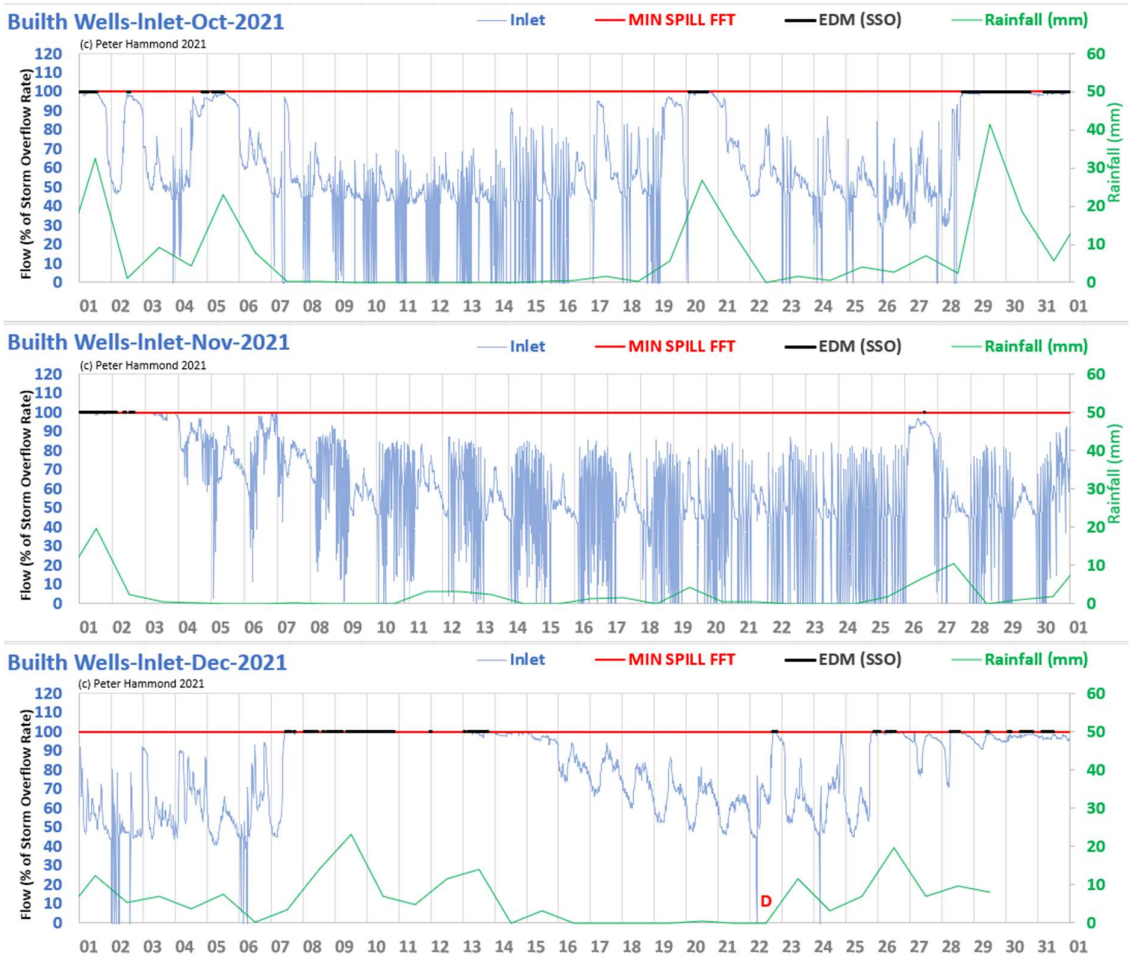


Fig 1: WASP believes that the last three months of 2021 involved only one illegal spill (Dec 22nd)

In contrast, WASP believes there were more than 20 illegal spilling days in the first 3 months of 2021.

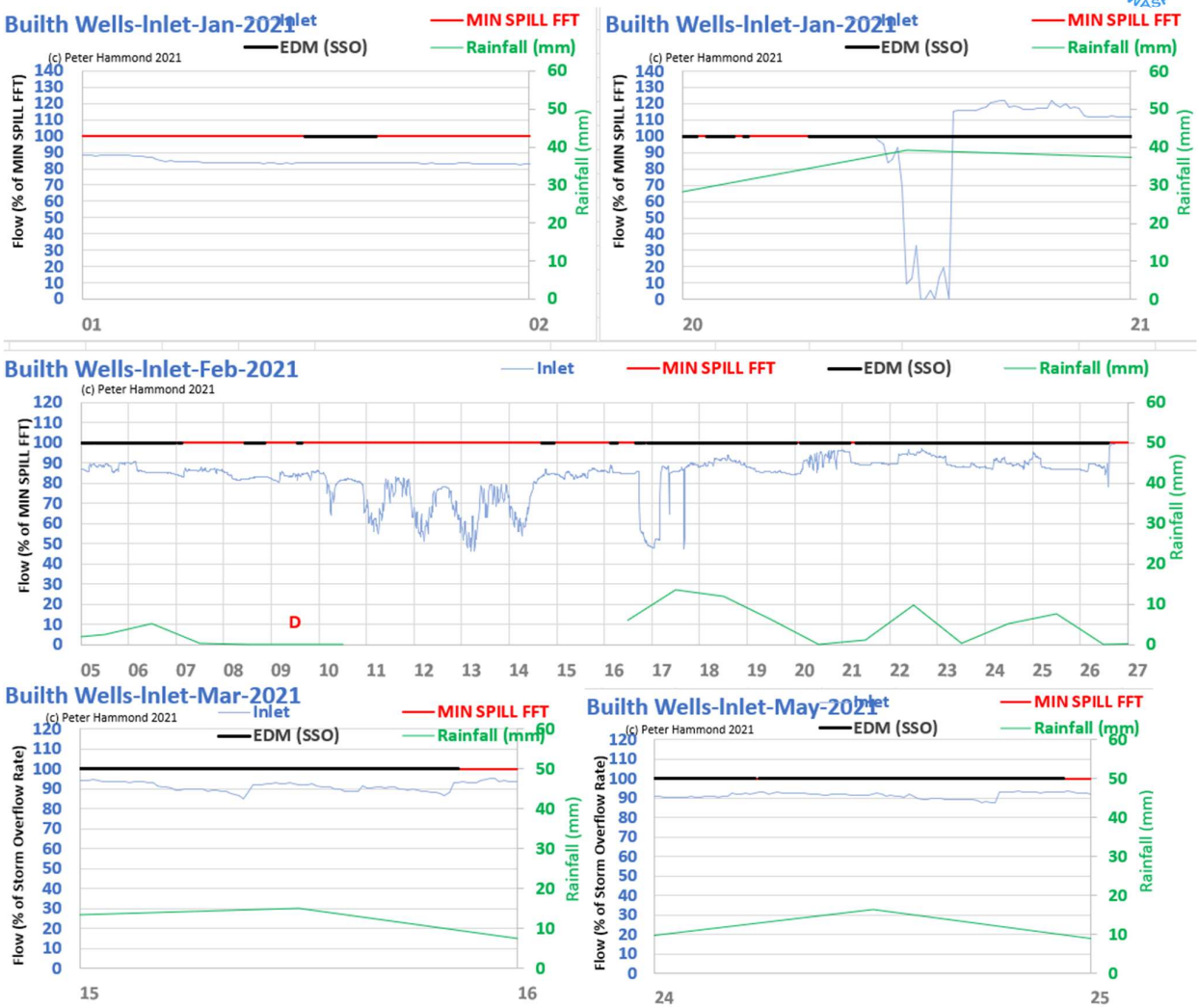


Figure 2: WASP believes there were 23 illegal spilling days in 2021 at Builth Wells STW

2020

As with 2021, the spills are compliant in the latter part of the year (**Fig.** 3) and non-compliant at the beginning.

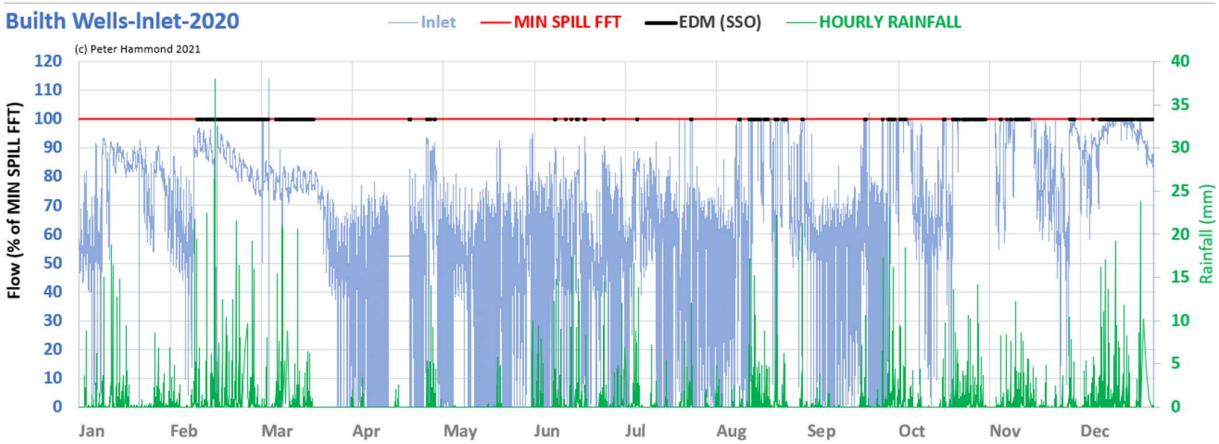


Figure 3: 2020 overview of treatment, spill and (hourly) rainfall data for Builth Wells STW showing the contrast in spill compliance at the beginning and end of the year

WASP believes there were over 360 spilling hours in Jan'20 before the EDM device was commissioned (**Fig**. 4).

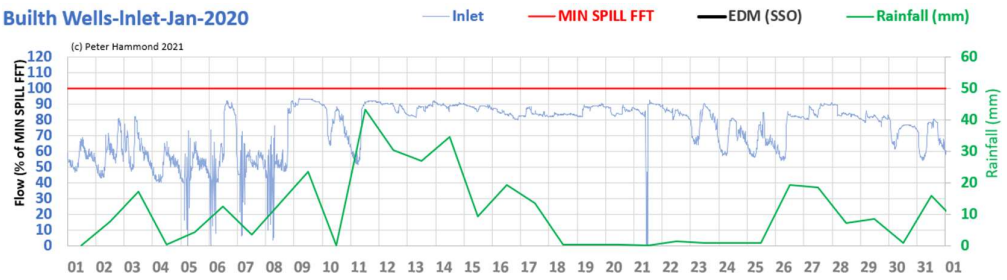


Figure 4: WASP believes there were 300+ spilling hours in Jan'20 at Builth Wells STW before EDM commissioning

WASP also believes there were at least 50 illegal early spilling days at Builth Wells STW in 2020 (**Fig**. 4).

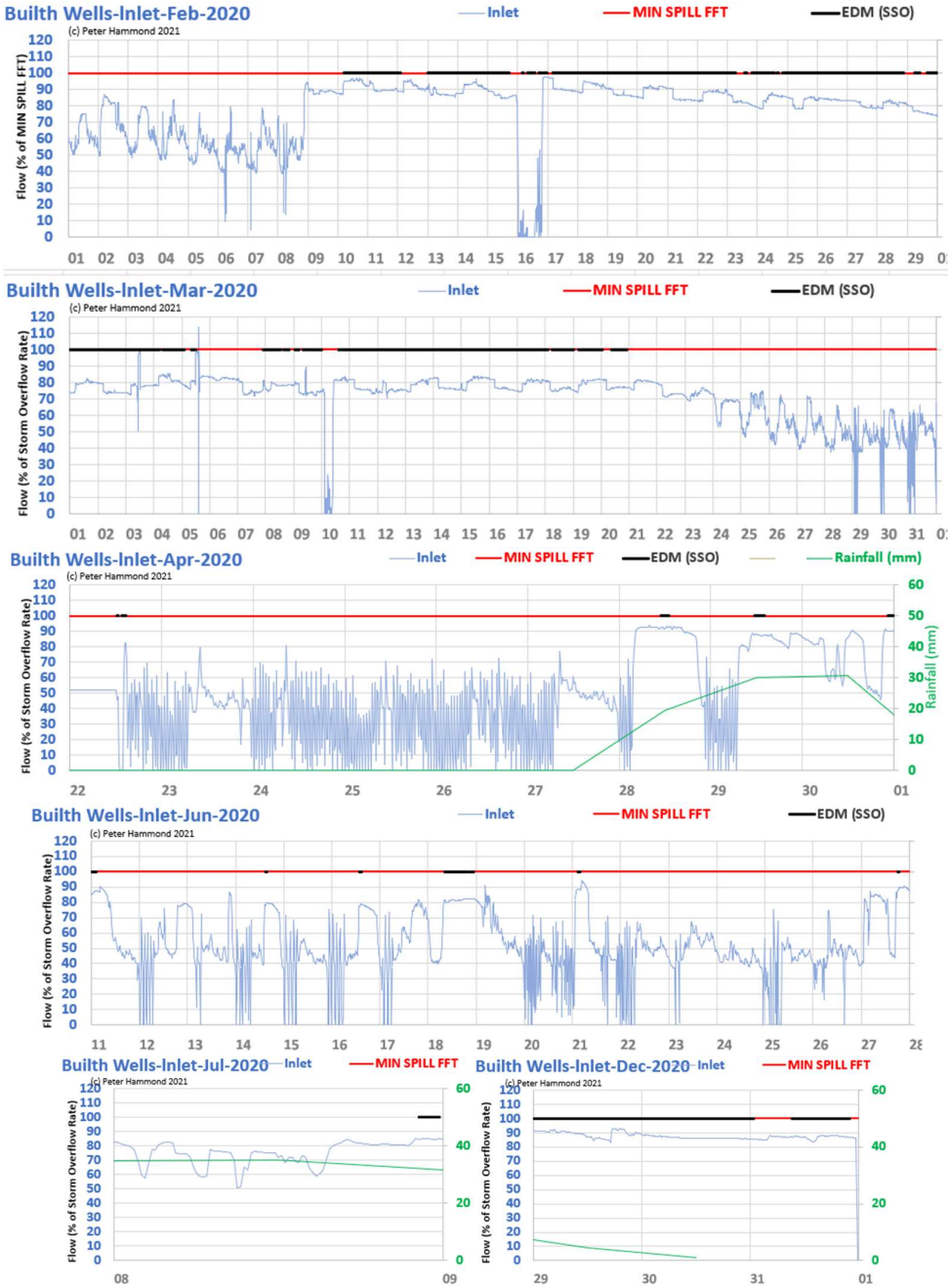


Figure 5: WASP believes there were at least 50 illegal early spilling days at Builth Wells STW in 2020 (Feb 11-29; Mar 1-5,8-20; Apr 22,29,30; Jun 11,14,16,18,21,27; Jul 8; Dec 29-31)

2019

WASP believes there were more than 1600 spilling hours in 2019 at Builth Wells STW, as illustrated in **Fig**. 6. WASP believes a cautious estimate of illegal spilling days is 15.

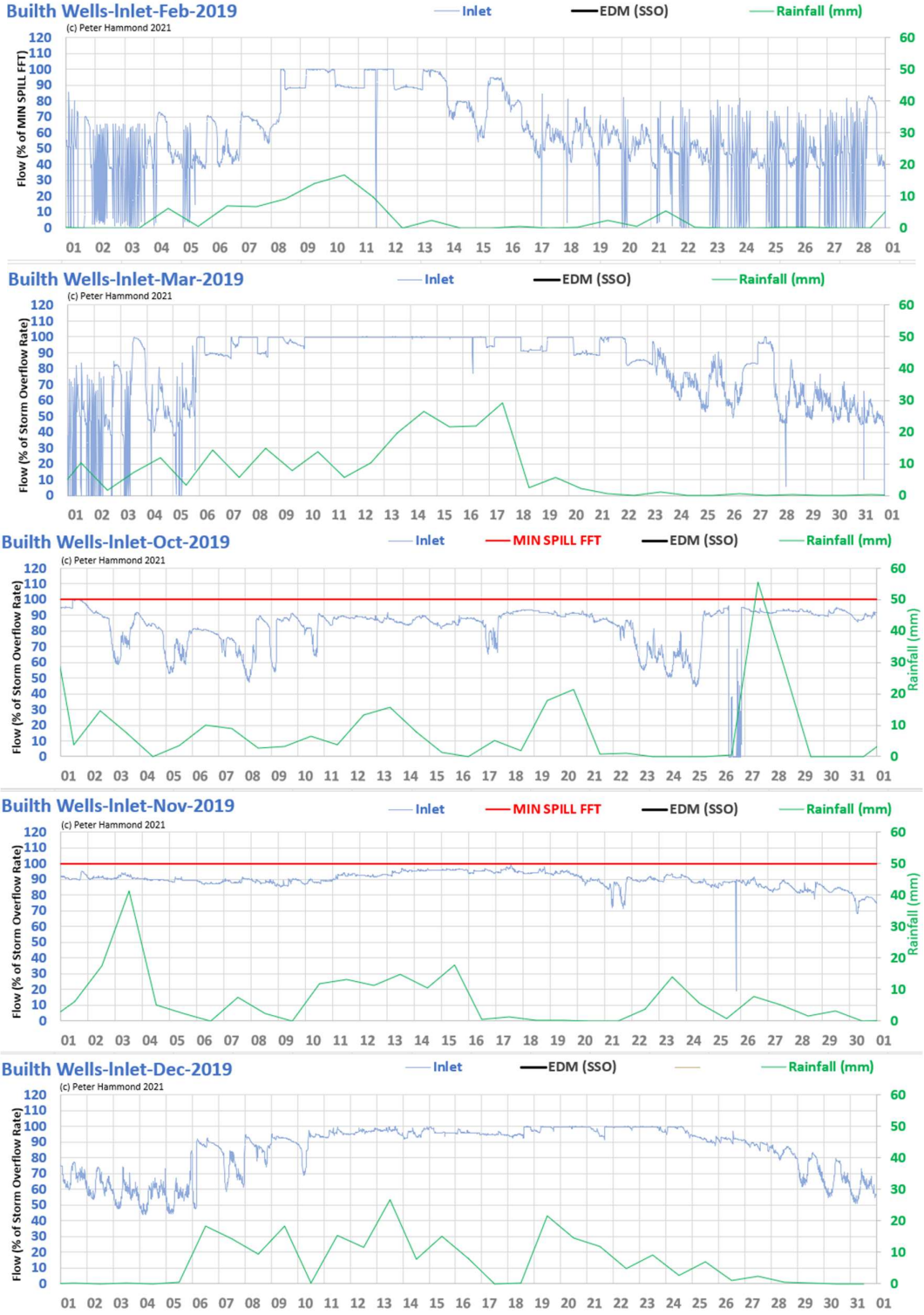


Figure 6: WASP believes there were long periods of spilling in the 1st and 4th quarters of 2019

2018

WASP believes there were more than 1600 spilling hours in 2018 at Builth Wells STW, as illustrated in **Fig**. 7. WASP believes a cautious estimate of illegal spilling days is 10.

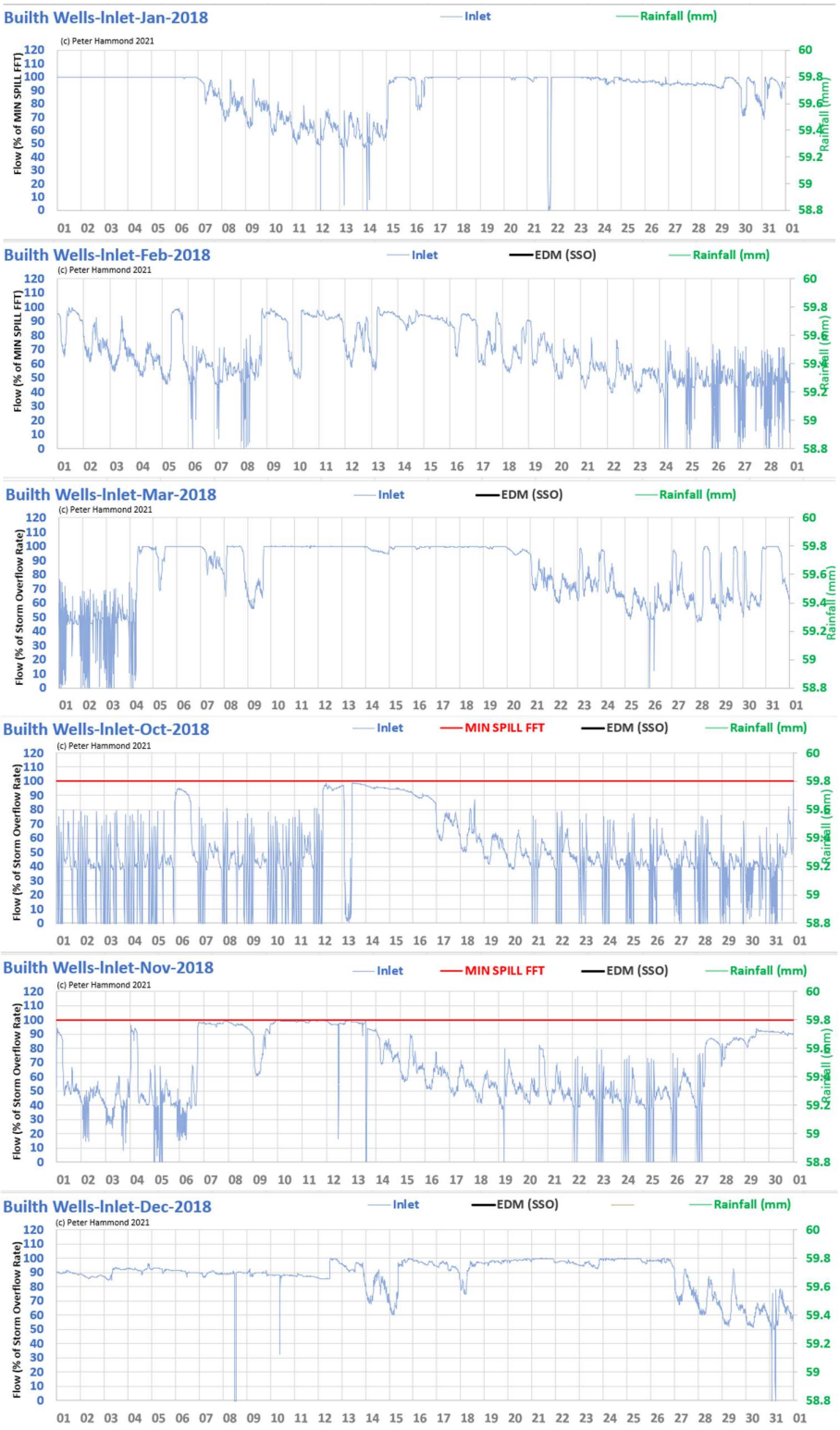


Figure 7: WASP believes there over 1600 spilling hours in 2018 at Builth Wells STW

Ruthin STW - WELSH WATER (WW)

year	hours	spills	active	comments	WASP beliefs/comments
2018	SO:58 SSO:598	SO:40 SSO:171	SO: SSO:		3 illegal spilling days at least 6.2 million litres of sewage discharged
2019	SO:220 SSO:1,488	SO:41 SSO:115	SO: SSO:		22 illegal spilling days at least 32.6 million litres of sewage discharged
2020	SO:195 SSO:2,384	SO:38 SSO:151	SO:96.7% SSO:97.2%		SO: 238 hours according to WW detailed spill data 61 illegal spilling days at least 52.4 million litres of sewage discharged
2021	SO:195 SSO:1,613	SO: SSO:118	SO: SSO:99.94%		29 illegal spilling days at least 43.1 million litres of sewage discharged

Table 1: EDM annual summary spill data submitted to EA by Welsh Water for Ruthin STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Ruthin STW has been working at 100% capacity since 2018. It serves a population of over 6,400 and discharges untreated sewage into the River Clwyd via an inlet storm overflow (SO) and a settled storm overflow (SSO) from storm tanks. The inlet weir limits the flow into the works to 114.3 l/s and any excess untreated sewage is discharged to the River Clwyd via the SO. The flow to full treatment (capacity) of the works is 48.7 l/s and excess above that is diverted to the storm tanks which when full overflow to the River Clwyd via the SSO. Whenever both overflows are simultaneously in operation, the difference between these rates, 65.6 l/s, is overflowing from the storm tanks. All of the untreated sewage overflows should have passed through a grill to remove condoms, sanitary products, wet wipes and the like. A photograph posted on the Vale of Clwyd Angling Club website[26] suggests that the removal of such sewage detritus may not be totally successful. WASP has not verified the accuracy of this website posting.

2018

In 2018, the detailed spill start-stop times are more closely related to the sewage treatment being above the storm overflow rate as can be seen in the monthly charts for January and December 2018 (**Fig**. 1).

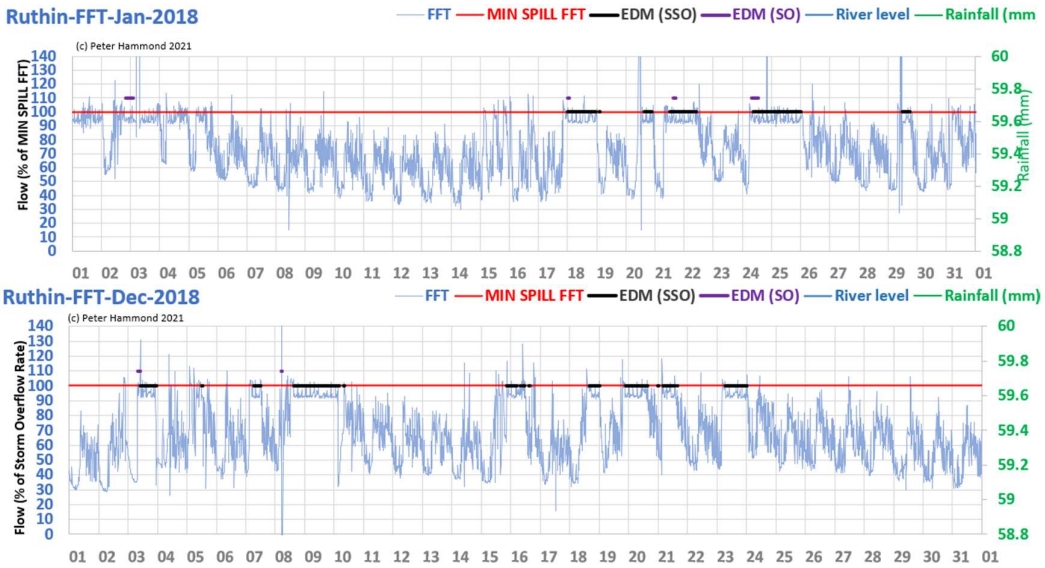


Figure 1: Janury and December monthly charts for Ruthin STW showing the "crisper" link between spills and sewage treatment data resulting in spills that are compliant with the discharge permit

Both overflows were in simultaneous operationin 2018 for 26 hours during which 6.2 M litres of untreated sewage were discharged to the River Clwyd. WASP believes there are just 3 illegal early spills at Ruthin STW in 2018 (**Fig**. 2). After 2018, the number of illegal "early" spills appears to increase year on year.

[26] https://www.facebook.com/groups/471617546359606/posts/1731158237072191/

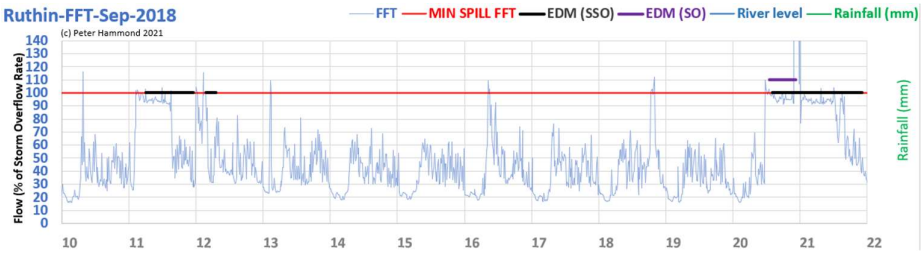


Figure 2: WASP believes there were 3 illegal early spilling days at Ruthin STW in 2018

2019

Although, DCWW's EDM summary EDM data submitted to the EA for Ruthin STW matches the detailed EDM data provided to WASP, WASP believes there were at least 22 illegal spilling days in 2019 (**Fig**. 3).

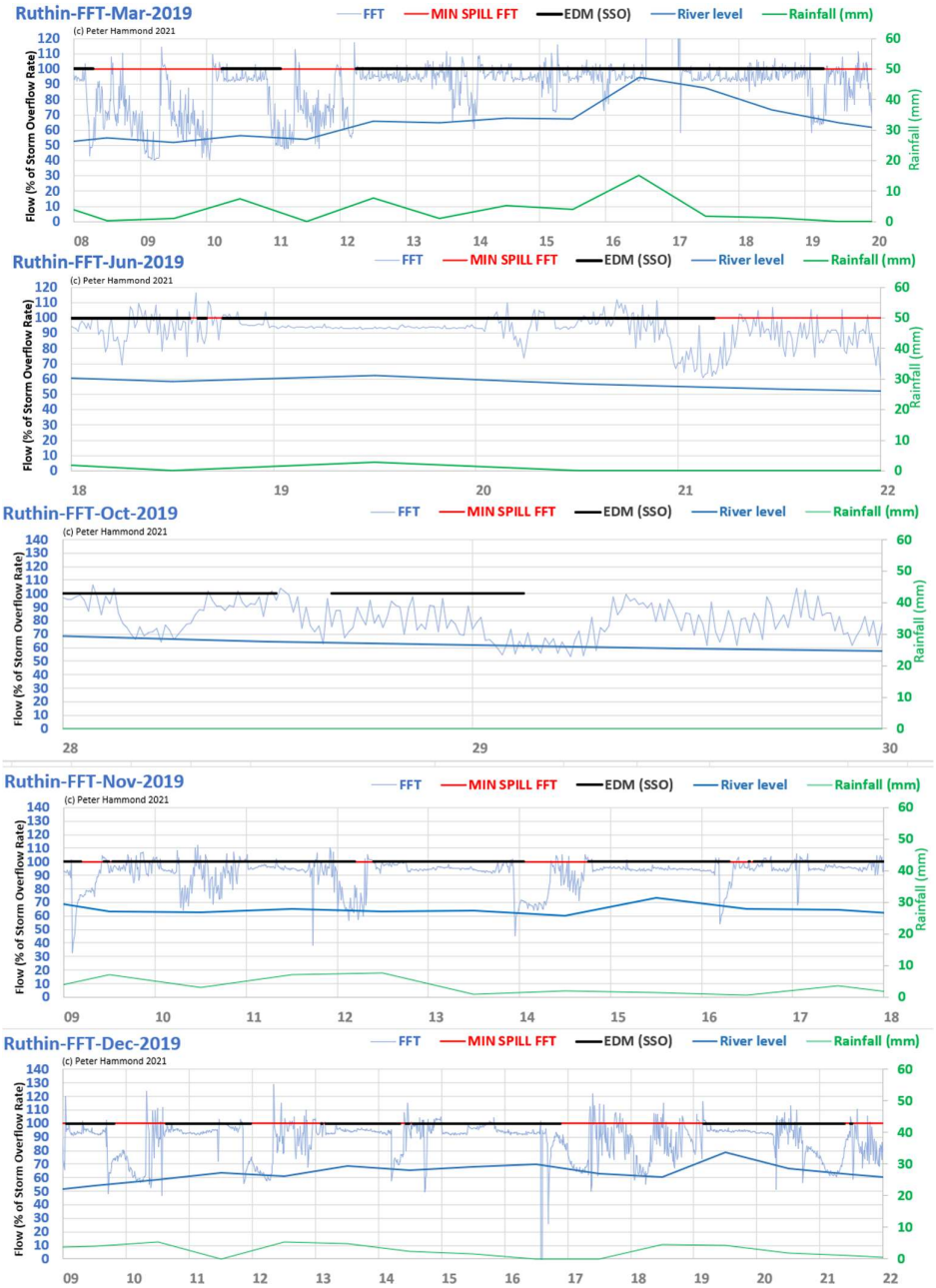


Figure 3: WASP believes there were 22 illegal spillingdays at Ruthin STW in 2019 (Mar 8,11,13-15,19; Jun 18,20,21; Oct 28,29; Nov 9-10,12-14,16; Dec 9,11,14,20,21)

Both overflows were in simultaneous operation in 2019 for 138 hours during which 32.6 M litres of untreated sewage were discharged to the River Clwyd.

2020

DCWW's submission of summary spilling hours for the inlet storm overflow for 2020 (195) does not match those derived from the detailed start-stop times DCWW to WASP (238). Both overflows were in simultaneous operation for 222 hours during which 52.4 M litres of untreated sewage were discharged to the River Clwyd. WASP believes there were 61 illegal spilling days at Ruhin STW in 2020 (**Figs.** 4 and 5).

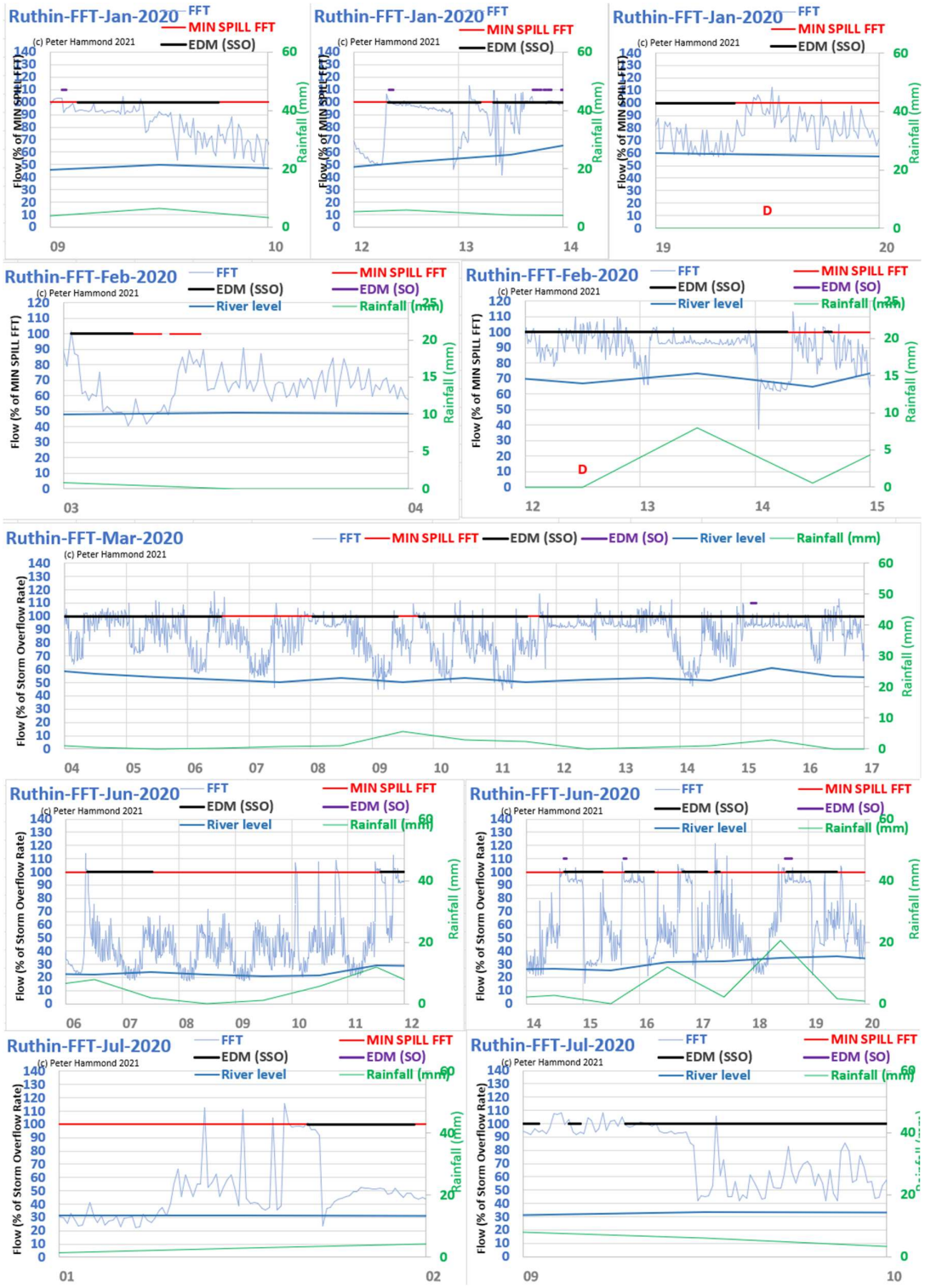


Figure 4: WASP believes there were at least 27 illegal early spilling days at Ruthin STW between Jan to July 2020 (Jan 9,12,13,19; Feb 3,12-14; Mar 4-6,8-11,13,14,16; Jun 6,7,11,15-17,19; Jul 1,9)

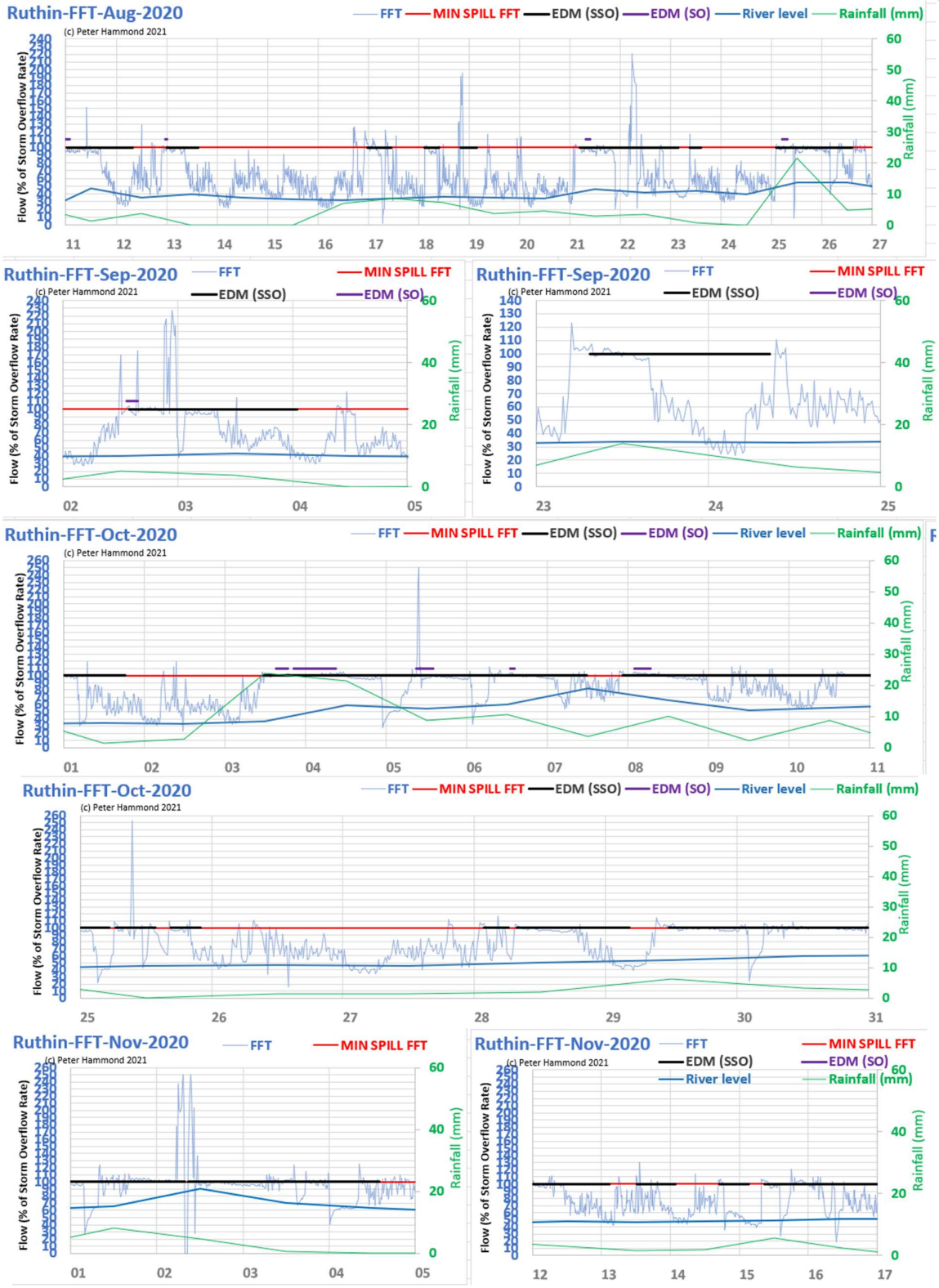


Figure 5: WASP believes there were 34 illegal early spilling days at Ruthin STW between Aug to Dec 2020 (Aug 11-13,17-19,21-23,26; Sep 2,3,23,24; Oct 1,4-7,9,10,25,28-30; Nov 1-4,12-16)

2021

DCWW's submission of summary spilling hours for 2021 match those derived from the detailed start-stop times provided to WASP by DCWW in response to an EIR request. Both overflows were in simultaneous operation for 183 hours when 43.1 M litres of untreated sewage were discharged to the River Clwyd.

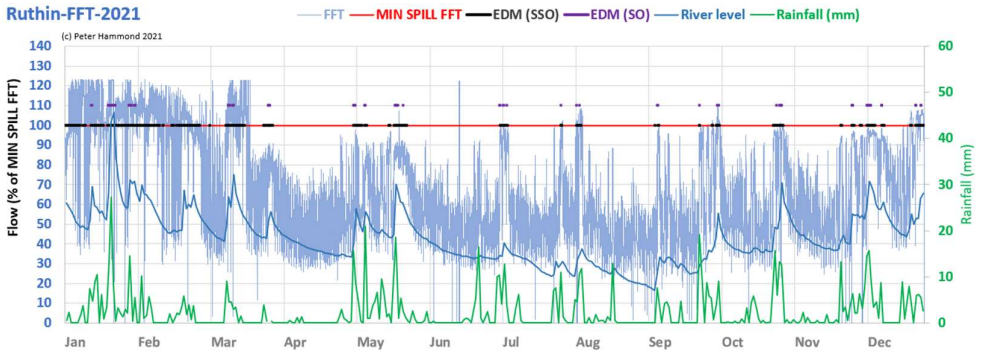


Figure 5: Annual overview for Ruthin STW for 2021

Another posting on the Vale of Clwyd Angling Club website includes a photograph of a discharge of a spill in progress on September 9th 2021. **Fig**. 6 confirms that there was a spill of untreated sewage from the storm tank overflow (SSO) for over 10 hours. This was within permit, but the short SSO spill at about 2 pm was "early" and hence illegal.

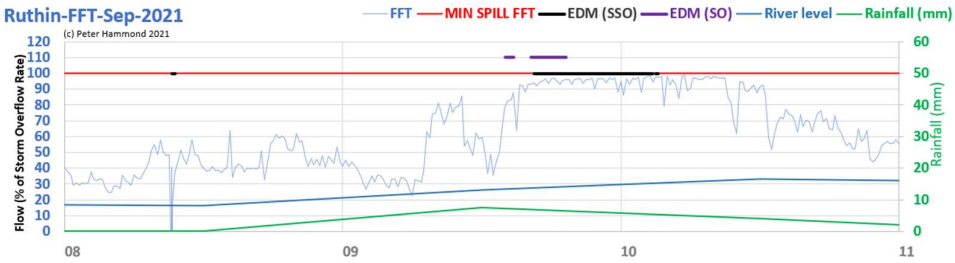


Figure 6: WASP believes there was a short illegal early spill at Ruthin STW on Sept 9th 2021.

In all, WASP believes there were at least 29 illegal spilling days at Ruthin STW in 2021 (**Fig**. 7).

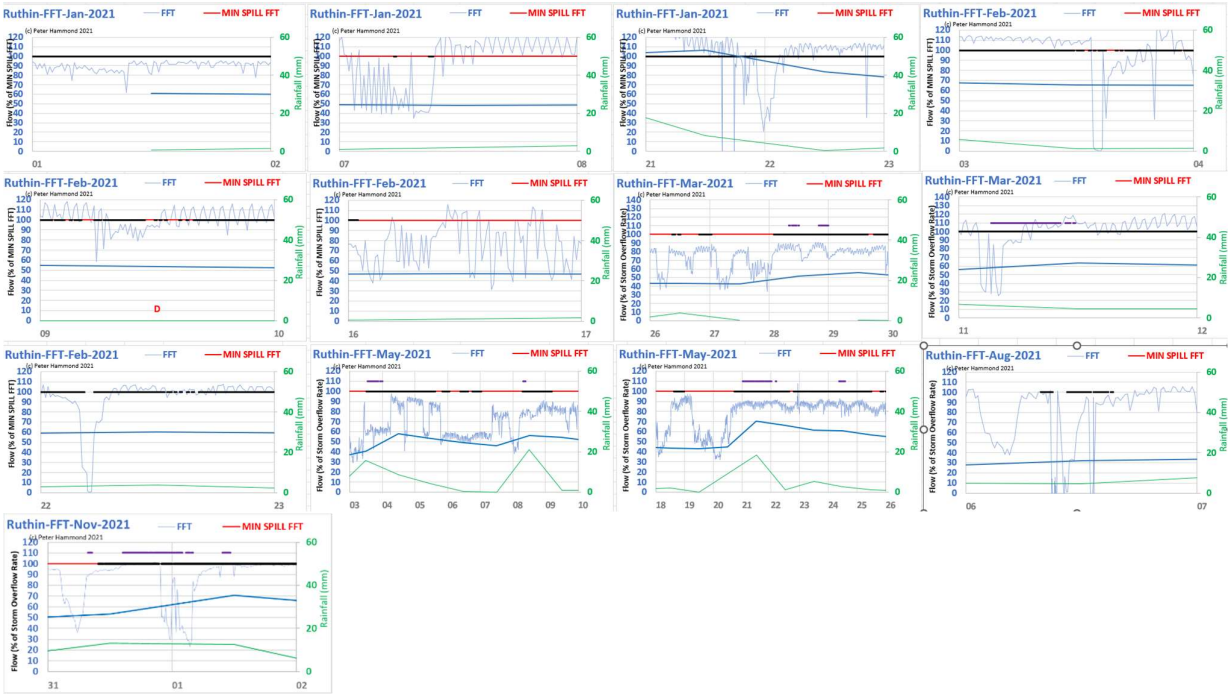


Figure 7: WASP believes there were at least 29 illegal spilling days at Ruthin STW in 2021 (Jan 1,7,22,23; Feb 3,9,16,22; Mar 11,26-29; May 3-6,8,9,18,20-25; Aug 6; Oct 31; Nov 1)

Llannon STW – WELSH WATER (DCWW)

EDM SUBMISSION TO EA					WASP beliefs/facts
year	hours	spills	active	comments	
2018	*2,500*				Over 2,500 spill hours & 18 illegal spilling days
2019	*2,030*				1,150 spill hours & 14 illegal spilling days
2020	3,339	206	96.72%		At least 118 illegal spilling days
2021	2,445	162	99.96%		At least 101 illegal spilling days

Table 1: EDM annual summary spill data submitted to EA by Welsh Water for Llanon STW

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

Llannon STW serves a population of about 256 and discharges to the River Morlais. NRW provided copies of several discharge permits. Only the oldest (from 1996) made explicit reference to a storm overflow rate (at the time proposed as 12.4 l/s). WASP has assumed that this rate is still applicable.

The EDM data for 2020 and 2021 submitted to the EA for Llanon STW suggest it is a frequent spiller. The flow to treatment data for 2018 and 2019 are also consistent with frequent spilling. DCWW provided WASP with spill data for 2019 giving a total of 2,030 hours which WASP believes can be extended by a further 1,150 giving a total of 3,180 spilling hours. WASP believes there were at least 2,500 spilling hours in 2018.

2021

The 2021 overview of flow to full treatment, detailed spill and rainfall data suggests that all spills were early except for those in the two periods of 29/4 to 25/7 ad 28/9 to 30/10. Hence, WASP believes there were 101 illegal spilling days at Llanon STW in 2021.

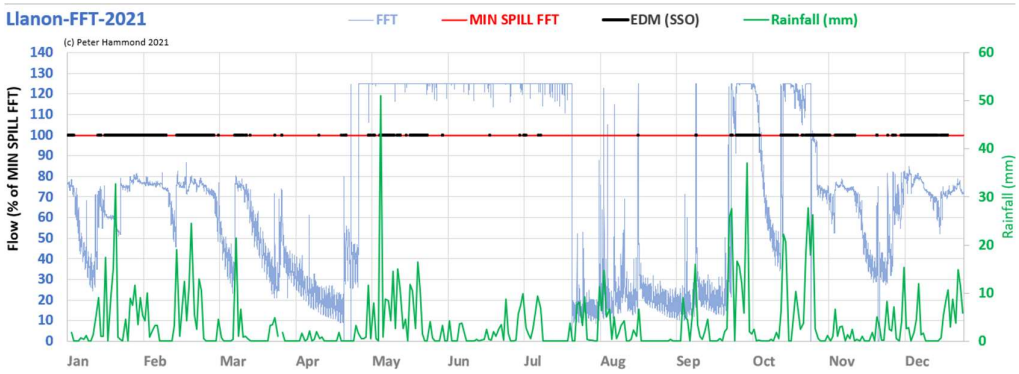


Figure 1: 2021 overview for Llanon STW

2020

The 2020 overview of flow to full treatment, detailed spill and rainfall data suggests that all of the spills were early from July onwards. Hence, WASP believes there were 118 illegal spilling days in 2020.

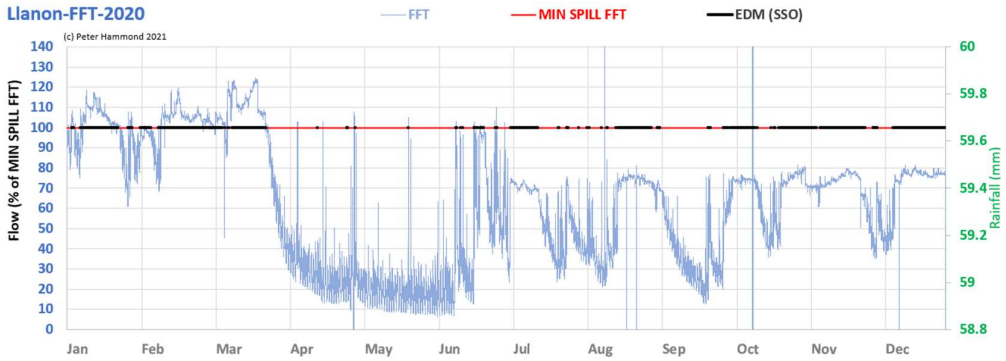


Figure 2: 2020 overviw for Llanon STW

2019

WASP believes the charts for Jan-Feb suggest more than 800 spilling hours and at least 14 illegal early spilling days.

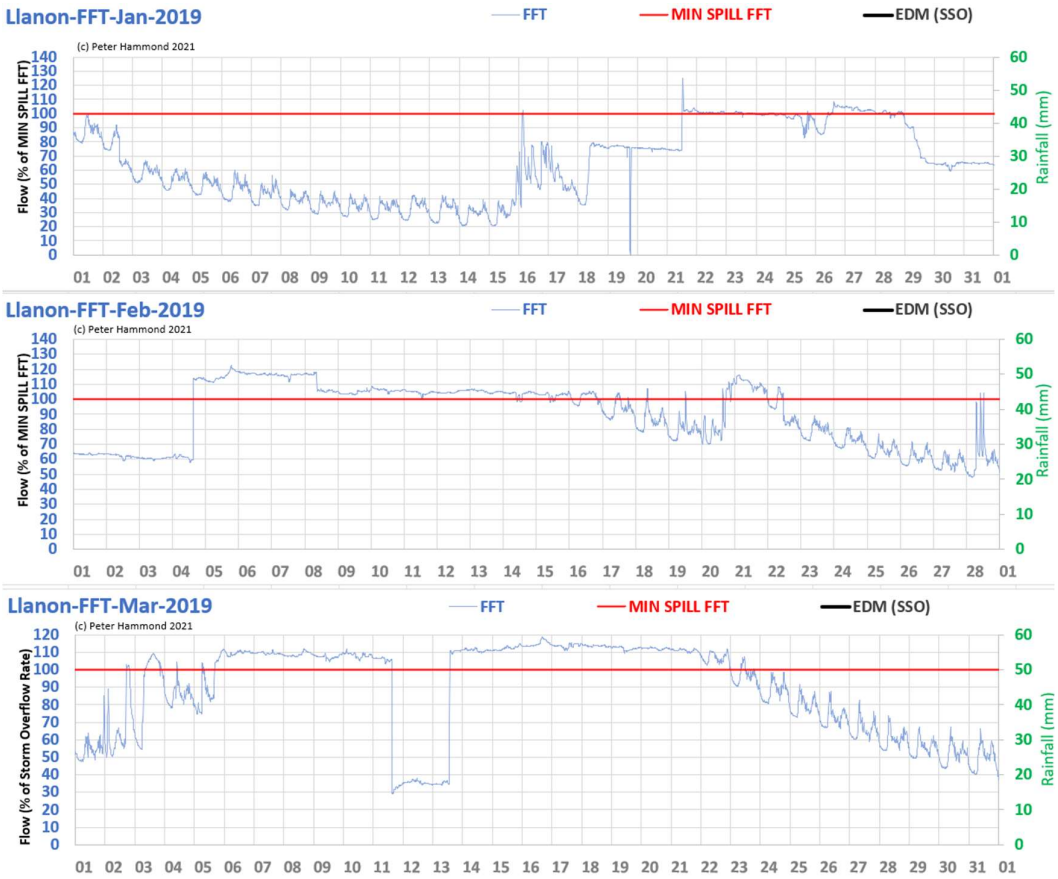


Figure 3: WASP believes there were at least 14 illega early spilling days in 2019 (Jan 18-21,29-21; Feb 1-4; Mar 11-13)

2018

WASP believes that all of the spills in 2018 were within permit except for 18 illegal spilling days when they were early.

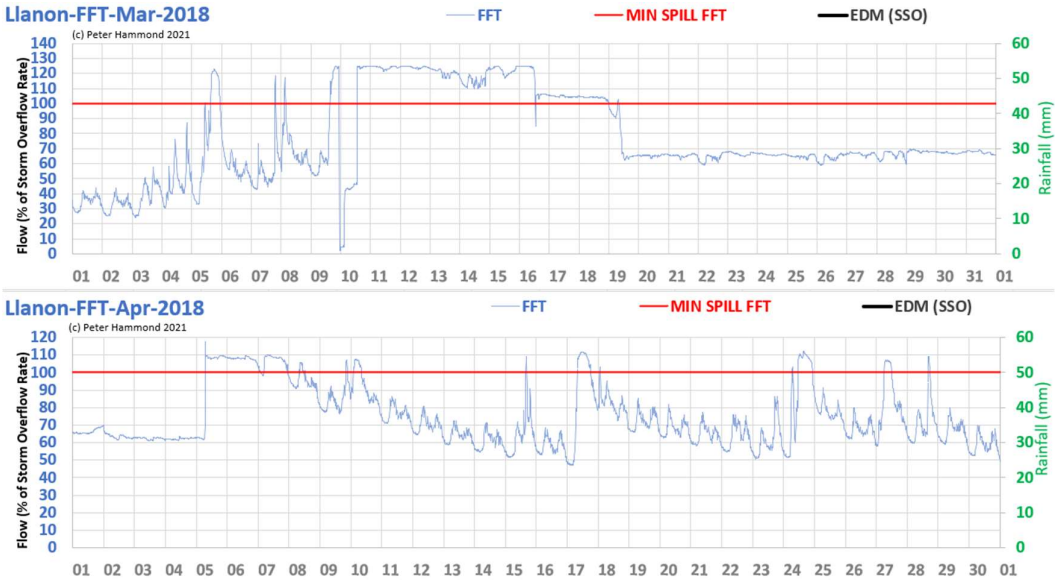


Figure 4: WASP believes there were 18 illegal spilling days in 2018 (Mar 19-Apr 5)

WESSEX WATER

Wessex Water are by far the most open and transparent WaSC with a significant amount of spill and treatment data made available on its website. Their responses to EIR requests are always prompt and straightforward.

Tetbury STW – WESSEX WATER (WW)

Tetbury STW was brought to the attention of WASP by Professor Richard Skeffington, a local water quality expert, who had been approached by owners of land adjacent to the `Tetbury Avon downstream of, and close to, Tetbury STW. The owners are concerned about the poor state of the river and especially the connected lakes which suffer regular algal blooms and excessive riverbed silt giving rise to associated management costs estimated at tens of thousands of pounds annually. By prior arrangement, on July 6th 2022, WASP and Professor Skeffington spent half a day onsite hosted by senior staff, one each from the two adjacent estates, who were very generous with their time and patiently answered many questions.

This short report summarises WASP's desktop analysis of the performance of Tetbury STW and a small amount of spot sampling of the river and effluent from Tetbury STW undertaken during the visit. Professor Skeffington has produced a separate report on water quality of the river.

The left half of Table 1 shows summary untreated sewage discharge data for the two storm overflows at Tetbury STW for the period 2018 to 2021 as submitted to the Environment Agency by Wessex Water. The right half shows the key findings arising from WASP's analysis of detailed sewage treatment and spill data that were requested from Wessex Water under Environment Information Regulation legislation, supplemented by publicly available rainfall and river level data.

EDM SUBMISSION TO EA					WASP beliefs/facts
year	hours	spills	active	comments	
2018	**SSO**: 17	64	88.2%		**SSO: 1,495 hours over 77 days; illegal spills on 3 days**
	SO: 573	36	100%		**SO: 79 hours over 80 days** **up to 10.4 M litres of untreated sewage spilled in 61 hours**
2019	**SSO**: 1,523	108	84%		**SSO: 1,674 hours over 91 days; illegal spills on 13 days**
	SO: 310	96	100%		**SO: 307 hours over 80 days** **up to 37.4 M litres of untreated sewage spilled in 221 hours**
2020	**SSO**: 1,222	73	100%		**illegal spills over 8 days**
	SO: 502	122	100%		**up to 61.2 M litres of untreated sewage spilled in 366 hours**
2021	**SSO**: 842	58	99.2%		**up to 22.7 M litres of untreated sewage spilled in 134 hours**
	SO: 182	86	99.8%		

Table 1: summary data submitted by Wessex Water to the EA compared to that derived by WASP from the detailed data it requested and obtained by EIR from Wessex Water

not_analysed | incorrect | unreliable | consistent | withheld | no EDM

WASP believes that

1. Tetbury STW's temporary storage tank capacity is undersized by about 20% resulting in more frequent and larger discharges of untreated sewage to the Tetbury Avon
2. for 2018 resp. 2019, there are major resp. minor discrepancies in the annual spilling hours provided to the EA and those derived from data provided to WASP
3. there were 24 days involving illegal discharges of untreated sewage
4. the volume of untreated sewage discharged via the storm tank overflow for periods when it was simultaneously in use with the inlet storm is estimated at more than 130M litres
5. in-river continuous monitoring combined with STW performance could provide more accurate analysis of the contribution of discharges of untreated sewage to the deterioration of the river

BACKGROUND

Tetbury STW

Tetbury STW serves a population of about 6,331[27]. It discharges to the (Tetbury) River Avon which rises just above Tetbury in Gloucestershire and flows south easterly, joining the Sherston Avon at Malmesbury in Wiltshire.

Tetbury STW has two physical outlets for the discharge of treated or untreated sewage: one, located at the most downstream point of the works, is for final treated effluent as well as settled, but untreated, discharges from a storm tank overflow (SSO); another is at the STW inlet, the most upstream point of the works, and is storm overflow (SO) for discharges of untreated sewage during periods of high loading. All of these discharges should have previously passed through a 6 mm screen for the removal of condoms, cotton buds, sanitary products, wet wipes and other solid objects. Under WINEP-19, Tetbury STW was due, by the end of March 2022, to have an EDM to record diversion to as well as overflow from the storm tanks.

Relevant extracts of Tetbury STW's discharge permit, issued by the Environment Agency (EA) and governing operation of its storm overflows, are given in **Fig**. 2.

2.3.4 For the discharge(s) specified in table S3.3:

(a) The discharge shall only occur when and only for as long as the flow passed forward is equal to or greater than the overflow setting indicated due to rainfall and/or snow melt.

(b) Off-line storm storage must be fully utilised before a discharge occurs. It shall only fill when the flow passed forward is equal to or greater than the overflow setting indicated due to rainfall and/or snow melt and shall be emptied and its contents returned to the continuation flow as soon as reasonably practicable. The minimum off-line storm storage required is specified in table S3.3.

Table S3.3 Storm sewage discharge settings

Effluent(s) and discharge point(s)	Description of discharge	Overflow setting l/s	Maximum size of solid matter	Screen aperture size	Minimum screen capacity flow l/s	Minimum storage capacity m^3
A2 Settled storm sewage via Outlet 1	Settled storm sewage	48.6	No greater than 6 mm in more than 1 dimension	6 mm x 6 mm	All flows shall be screened	276 (offline)
A3 Storm sewage via Outlet 2	Storm sewage	95.8	No greater than 6 mm in more than 1 dimension	6 mm x 6 mm	All flows shall be screened	N/A

Figure 2: extracts of Tetbury STW's discharge permit governing the storm overflows

The SO limits the rate at which unteated sewage enters Tetbury STW to 95.8 litres/sec. Any excess above that that is permitted to be discharged to the Tetbury Avon. The works is also permitted to divert untreated, excess sewage above 48.6 litres/sec to the storm tanks while maintaining that rate for sewage passed in to the treatment process. The contents of storm tanks are required to be pumped back into the treatment process when loading of the works allows or alternatively, if the overloading persists, are permitted to overfow into the adjoining watercourse subject to EA permit conditions (**Fig**. 2).

[27] According to the EU WWTD (https://uwwtd.eu/United-Kingdom/treatment-plant/ukenswwxwtp000087/history), Tetbury STW has a capacity equivalent to a population of about 8,283.

Both the SO and SSO are fitted with event duration monitors (EDMs) that detect when they are in use by recording the start and stop times of discharges (N.B. **not** the volume). When both overflows are simultaneously in use, and the storm tank is full, 47.2 litres/sec (95.8 – 48.6) of untreated sewage is discharged via the SSO to the Tetbury Avon. Hence, in that particular situation, an estimate can be made for one component of the untreated sewage discharge.

Field testing

WASP conducted field tests of phosphate and nitrate at three sites chosen to assess the impact of the treated sewage outfall from Tetbury STW:

A	a small groundwater spring joining the Avon via a short channel about 100 metres downstream of the treated effluent outfall
A1	Tetbury Avon above spring
B	treated effluent outfall
B1	3metres upstream of outfall
C	small stream tributary of Tetbury Avon about 400m upstream of confluence with river

These were spot samples taken on one occasion from moving streams in which nutrient concentrations may vary considerably diurnally and when untreated sewage overflows are active or have been recently active. Dilution depends on river level and source of flow as well as occasional augmentation pumped from a downstream source

The samples were taken between 1220 and 1445 hrs with Hanna Instruments low range 0 – 2.5 mg/l and high range 0- 30mg/l phosphate checkers and with a medium range nitrate meter 0-100mg/l.

Data sources

Every year, each water and sewerage company (WaSC) is required to submit to the Environment Agency (EA) the following data concerning discharges of untreated sewage:

- annual hours of discharge detected by EDMs on all storm overflows on the sewerage network, at sewage pumping stations and at sewage treatment works
- a count of blocks of such discharges according to a specific EA methodology
- % of reporting period for which each EDM device was operational.

WASP used an Environmental Information Request (EIR) to Wessex Water to obtain detailed sewage treatment data measured every 15 minutes (not just total for a day) and detailed start-stop times of individual discharges of untreated sewage via the SO and SSO (not just the total hours in a year). The EA only requests the detailed data if it suspects there is an issue needing investigation. Hence, for its analysis, WASP employed at least 100 times more data than the EA has immediate access to.

Daily rainfall data was obtained from NERC's CEDA data archive (https://data.ceda.ac.uk/badc/ukmo-midas/data) and daily river levels were obtained from https://riverlevels.uk/.

RESULTS

Capacity and loading of Tetbury STW

The total daily volume (TDV) of treated sewage at Tetbury STW (**Fig**. 1) shows that the lowest TDV during dry weather (dotted blue line in **Fig. 1**) has increased from about 541 tonnes (cu m) in 2010 to about 904 tonnes (cu m) in 2021 (**Table** 2), presumably reflecting housing development during that 12-year period.

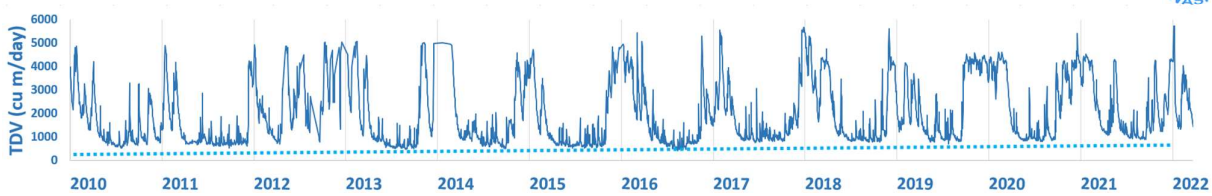


Figure 1: total daily volume (TDV) of treated sewage at Tetbury STW between 2010 and 2021

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
541	536	696	483	509	534	432	777	787	713	811	904

Table 2: lowest estimated annual TDV during dry weather for Tetbury STW between 2020 and 2021

Storm Tank Capacity

The storm tank volume at Tetbury STW is only 276 cu m when according to the EA[28] it should be at least 350 cu m – i.e. large enough to hold sewage arising from 2 hours' flow at 48.6 litres/sec (349.92=48.6*2*60*60/1000). A storm tank of the correct size would immediately result in fewer and shorter discharges of untreated sewage. So each time there is a spill into an empty storm tank at Tetbury STW, the spilling starts earlier than it should and an additional 74 (350-276) tonnes of untreated sewage is discharged to the river.

Inconsistencies in data submitted to EA and that submitted to WASP

The left half of Table 1 above summarises the overflow discharge data submitted to the EA by Wessex Water for Tetbury STW since EDM devices were installed in 2018. The right half of Table 1 identifies inconsistencies between the datasets provided to the EA and to WASP by Wessex Water as well as potentially illegal spills of untreated sewage breaching the discharge permit issued by the EA to Wessex Water for the operation of Tetbury STW.

WASP believes that the annual discharge hours submitted by Wessex Water to the EA for 2018 and 2019 for the SO and SSO are incorrect. The data provided to WASP for 2018 corresponds to a total of 1,570 hours of spilling from the SO and SSO, compared to a total of about 589 hours submitted to the EA. Similarly, for 2019, the EDM spill submission by Wessex Water to the EA (total of 1,833 hours) is inconsistent with the data provided by Wessex Water to WASP (1,981 hours), although much less so than for 2018. The EDM summary spill data for 2020 and 2021 provided to the EA and the corresponding detailed spill data provided to WASP are consistent.

WASP believes Wessex Water breached its permit conditions for untreated sewage discharges on 24 days occasions: 4 in 2018; 12 in 2019; and 8 in 2020.

In its 2021 EDM spill submission to the EA, Wessex Water admitted that sewage fungus had been observed at the SSO outlet of Tetbury STW at the end of March 2020. This is consistent with months of almost continuous dumping of untreated sewage between October2019 and March 2020. Why was this not reported in the 2020 submission to the EA?

Spot Sampling of Tetbury Avon and Tetbury STW Effluent Discharge

Location A – a small groundwater spring joining the Avon via a short channel about 100 metres downstream of the Treated effluent outfall. Samples were taken from the spring and from the Avon just upstream of the confluence with the spring.

Spring water Phosphate 0.15mg/l Nitrate 30.6mg/l

[28] https://www.gov.uk/government/publications/water-companies-environmental-permits-for-storm-overflows-and-emergency-overflows/water-companies-environmental-permits-for-storm-overflows-and-emergency-overflows

A1	Phosphate 0.63mg/l	Nitrate 34.5 mg/l
B	Phosphate 3mg/l and 2.3mg/l	Nitrate >100mg/l exceeded meter range
B1	Phosphate 0.6mg/l	Nitrate 4.5mgl
C	Phosphate 0.56mg/l	Nitrate 16.9mg/l

N.B Permits refer to phosphorous whereas Hanna meters record orthophosphate. To convert from units of orthophosphate (PO 4 3-) to orthophosphate as phosphorus (PO 4 -P), multiply by 0.3261.

Surface and underwater video was also taken and has been edited into a short YouTube video with comments.

DETAILED ANALYSIS

2018

An overview chart for 2018 is shown in **Fig**. 3.

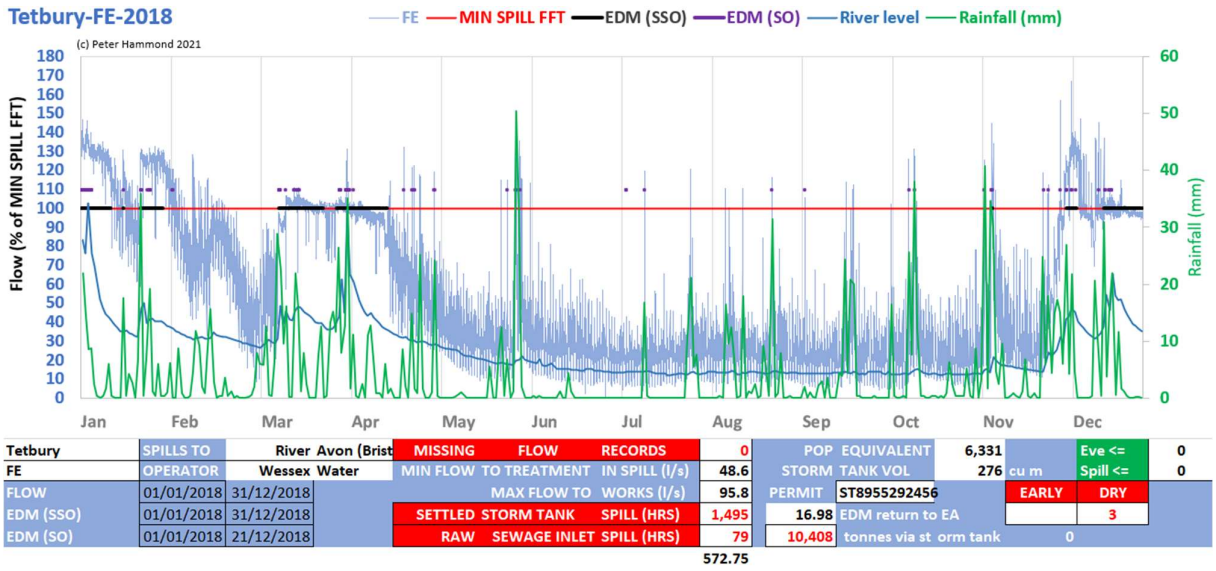


Figure 3: overview chart for 2018 showing final treated effluent (FE), EDM detected spills for SO and SSO for Tetbury STW, as well as rainfall (Westonbirt Arboretum) and river level (Brokenborough/Tetbury Avon)

The final effluent (FE), rainfall and river level data appear to be consistent with each other as well as with the SO and SSO discharge data supplied to WASP. The submission by Wessex Water to the EA of 16.98 hours and 572.75 hours respectively for the annual SSO and SO spills are clearly incorrect and require justification or admission of error.

The Water Industry often insists that rivers are swollen and in full spate during untreated sewage spills. **Fig**. 3 shows that during some untreated sewage discharges, the river level can be as high as 1 metre during the greatest rainfall. But there are times when the level is between 30 cm and 40 cm in contrast to a dry weather level of about 20 cm.

Finally, three of the discharges of untreated sewage to the Tetbury Avon in 2018 are unbroken for 11, 13 and 14 days giving little opportunity for recovery (**Fig**. 4).

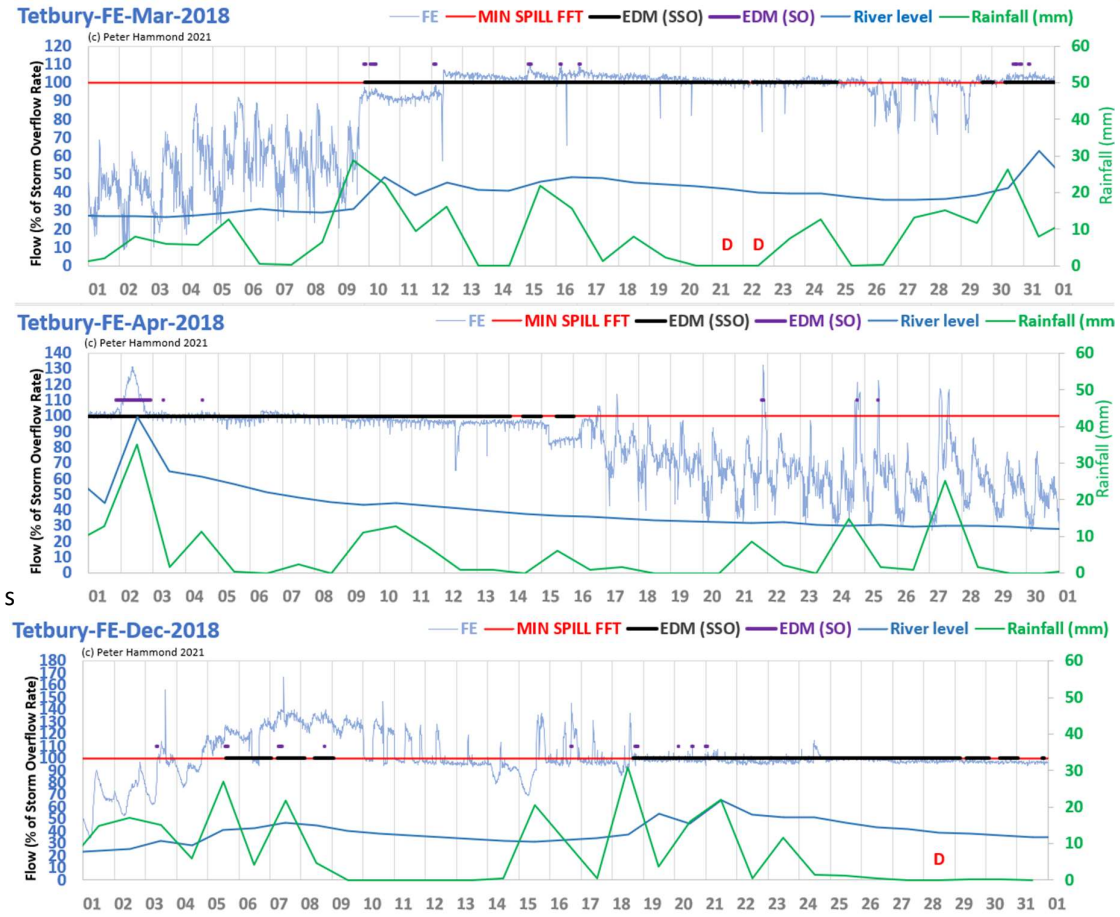


Figure 4: monthly charts for Tetbury STW in 2018 showing long spills and 3 illegal "dry" spilling days (labelled D)

2019

The overview chart for 2019 for Tetbury STW is shown in **Fig**. 5.

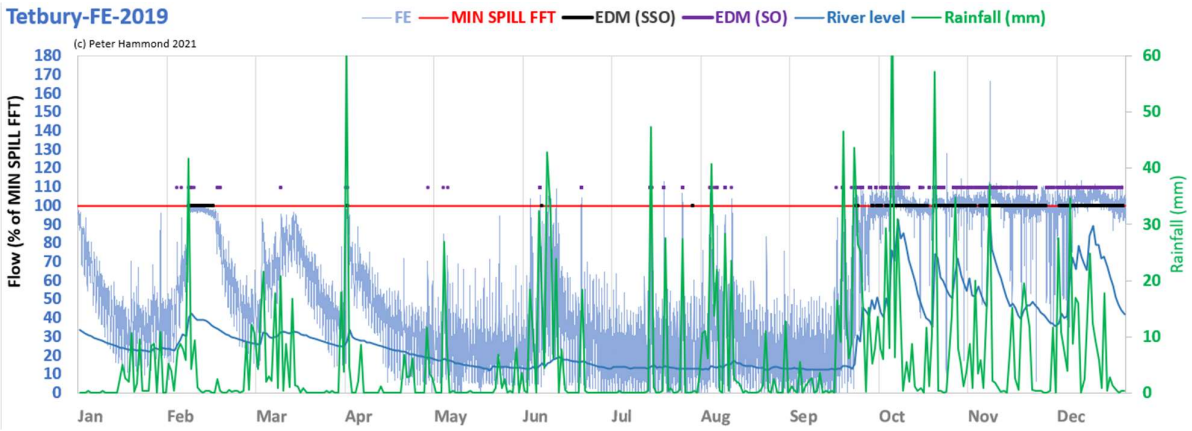


Figure 5: overview chart for treatment, EDM spill, rainfall and river level data for 2019 for Tetbury STW

There are relatively small discrepancies between the summary spilling data submitted by Wessex Water to the EA and that derived from detailed spill data provided to WASP.

Clearly, during the wet period in autumn 2019, the spilling of untreated sewage was almost unbroken for three months during which WASP estimates most of the 37 million litres of untreated sewage, almost 15 Olympic sized pools worth, were dumped to the Tetbury Avon via the storm tanks. That is almost one

Olympic pool's worth per week. It is impossible to say how much untreated sewage was dumped via the inlet SO.

2020

The overview chart for 2020 (**Fig**. 6) shows an intense period of dumping of untreated sewage to the Tetbury Avon from mid February to mid March when WASP believes about 25 million litres of untreated sewage were dumped into the Tetbury Avon, i.e. more than an Olympic pool's worth per week. This is the likely cause of the sewage fungus that Wessex Water observed at the end of March 2020, as reported in their 2021 submission to the EA – why not in its 2020 submission, WASP would like to know?.

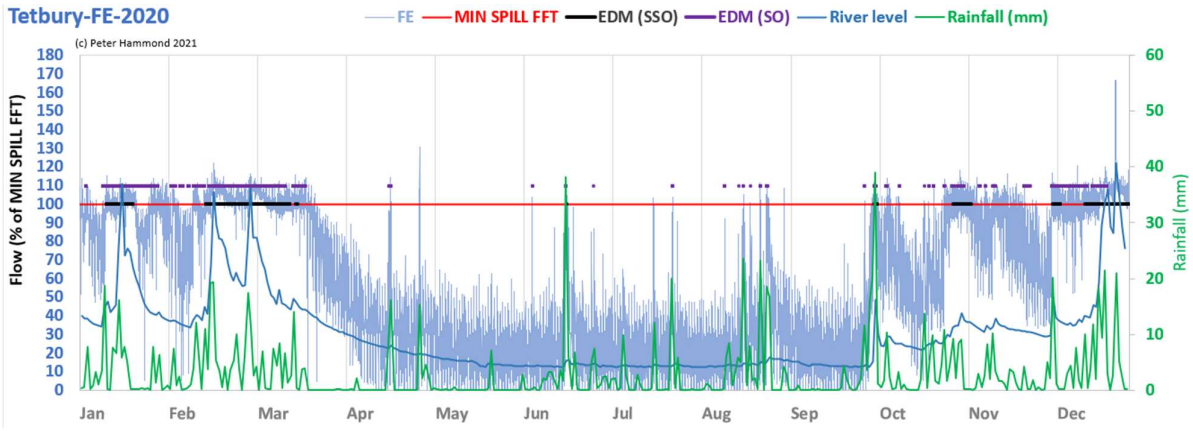


Figure 6: overview chart for 2020 for treatment, EDM spill, rainfall and river level data for Tetbury STW

WASP also believes that on 8 day, the spills breached the works' permit (examples in **Fig**. 7)

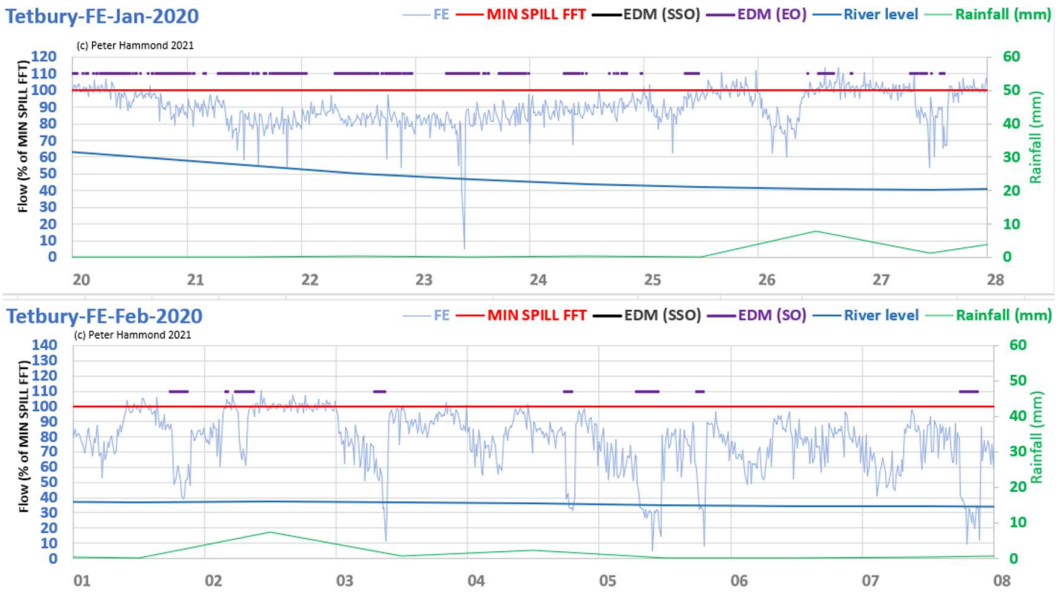


Figure 7: Examples of spilling days that WASP believes breached the EA discharge permit for Tetbury STW (Jan 23rd; Feb 1st, 3rd, 4th, 5th and 7th)

2021

The overview chart for 2021 (**Fig**. 8) demonstrates consistency between the sewage treatment, rainfall, river level and spill data. The total spilling hours for 2021 confirm reductions in discharges of untreated sewage from both overflows at the site. Approximately 22.7M litres of untreated sewage were discharged into the Tetbury Avon when both overflows operated in tandem.

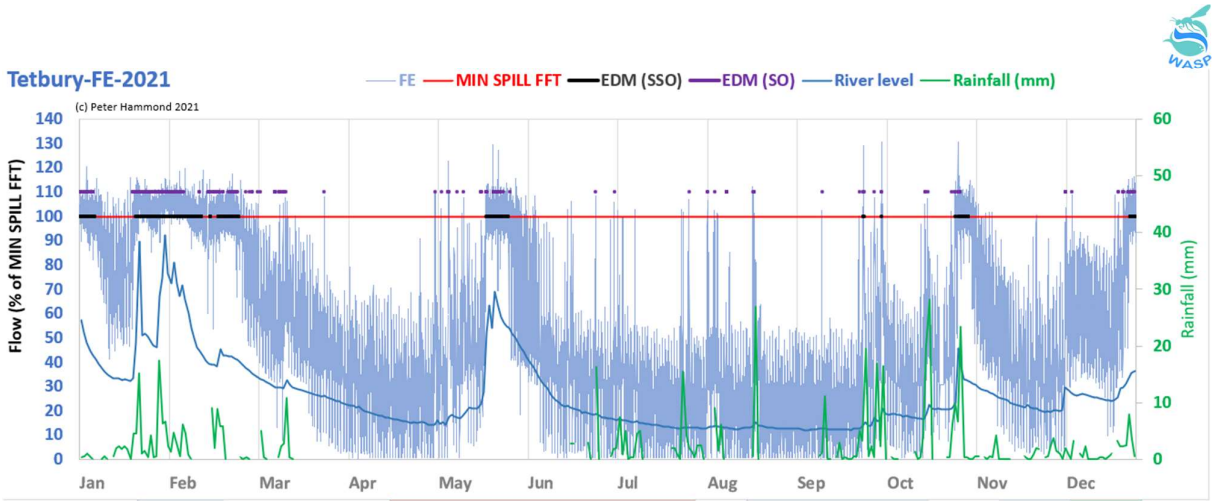


Figure 8: overview chart for 2021 for treatment, EDM spill, rainfall and river level data for Tetbury STW

YORKSHIRE WATER

Wentworth STW - YORKSHIRE WATER (YW)

Wenworth STW is a small works serving a population of about 1,500 and discharges to a tributary of the Harley Dyke. It is located between Rotheram and Barnsley.

Table 1: summary data submitted by YW to the EA for Wentworth STW

year	EDM SUBMISSION TO EA hours	spills	active	comments	WASP beliefs/facts
2018	NO SPILL DATA WAS SUBMITTED TO EA				YW gave detailed spill data to WASP for 751 hours at least 3 illegal spilling days
2019	NO SPILL DATA WAS SUBMITTED TO EA				YW gave detailed spill data to WASP for 2,550 hours reliable EDM data suggests about 600 spilling hours reliable EDM data suggests at least 6 illegal spilling days
2020	7740.42	276	96.22%		EDM spill data unreliable - not commented on by YW in EA return
2021	1,572	115	85.60%	Sensor failure / issue Resolved - August	reliable EDM data suggests at least 5 illegal spilling days

The EDM at Wentworth STW was commissioned in 2018 according to YW's 2021 EDM submission. Despite providing detailed EDM spill data to WASP for 2018 and 2019, YW did not submit any summary spill data for either year for Wentworth STW, according to the EA's records. WASP has not yet been able to confirm YW's explanation that their permit at the time did not require EDM data to be submitted. The two most recent permits for Wentworth STW, effective from 01/04/2010 and 22/12/2021, have been requested via the EA's Public Register. YW did submit summary spill data to the EA for 2020 and 2021. There appear to have been EDM performance issues throughout the 4 years of installation which were not resolved until August 2021.

2018

The 2018 overview for Wentworth STW (**Fig**. 1) shows a loss of flow to treatment data during Aug/Sept when spills occurred but cannot be checked for compliance.

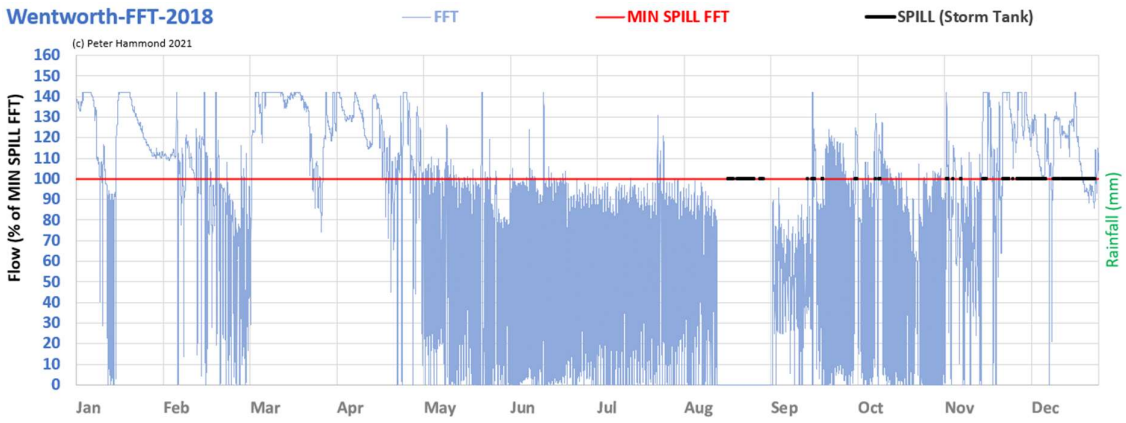


Figure 1: 2018 overview data for Wentworth STW showing flow to treatment, capacity and spill data

WASP believes there were at least 3 illegal early spilling days in 2018 (**Fig**. 2).

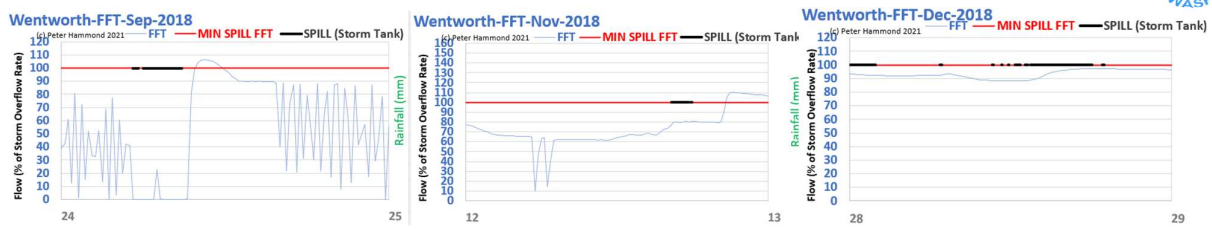


Figure 2: WASP believes there were at least 3 illegal early spilling days in 2018 (Sep 24; Nov 12; Dec 28)

2019

YW provided WASP with detailed EDM data for Wentworth STW corresponding to 2,550 hours. The 2019 overview for Wentworth STW (**Fig**. 3) suggests that the EDM data are reliable until November when the flow to treatment data is not consistent with such continuous spilling. Alternatively, if the EDM data are reliable then there are many illegal early spilling days

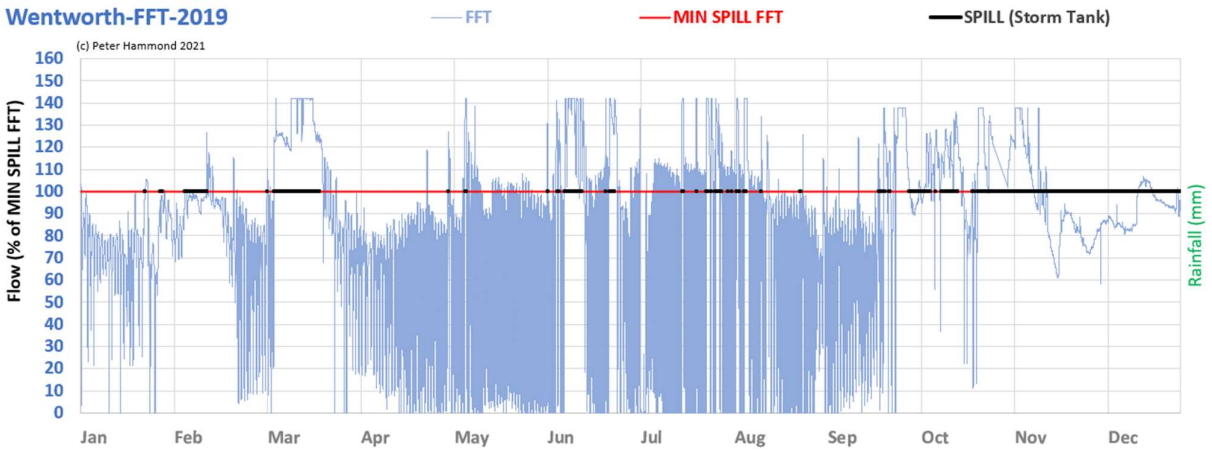


Figure 3: 2019 overview data for Wentworth STW showing flow to treatment, capacity and spill data

WASP believes the reliable EDM data suggest there were at least 6 illegal early spilling days in 2019 (**Fig**. 4).

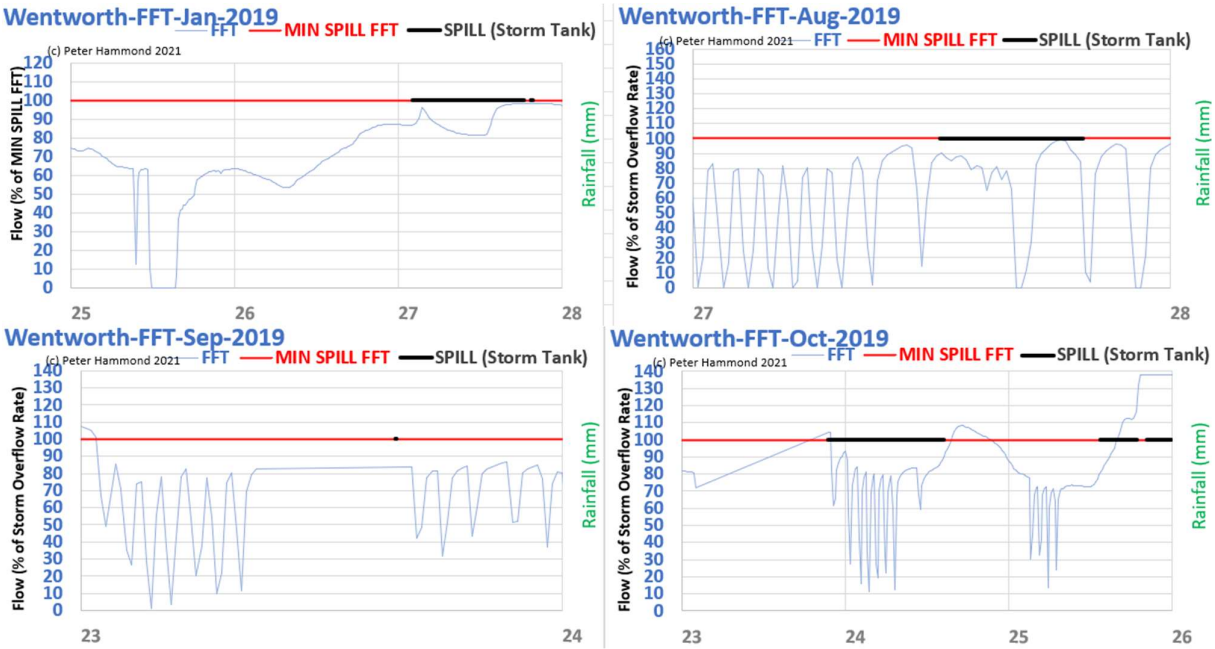


Figure 4: WASP believes there were at least 6 illegal early spilling days in 2019 (Jan 27; Aug 27; Sep 23; Oct 23-25)

2020

YW submitted summary EDM spill data for Wentworth STW for 2020 of 7,740 hours. This is consistent with the total derived from the detailed spill data provided by YW to WASP in response to an EIR request. However, the detailed EDM data suggest that the device was not functioning properly from November 2019. The 2020 overview (**Fig**. 5) suggests that the malfunctioning continued throughout 2020 giving rise to a very large and unlikely spilling total of over 7,740 hours.

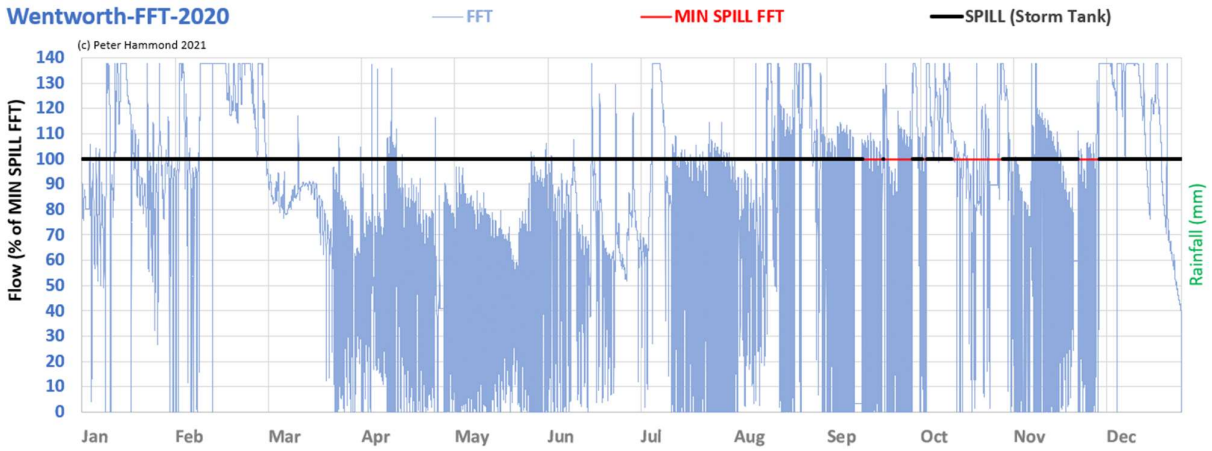


Figure 5: 2020 overview data for Wentworth STW showing flow to treatment, capacity and spill data

Despite the obviously incorrect spilling total, YW made no comment of an EDM malfunction in its spill submission to the EA for 2020. WASP believes there were illegal spills at Wentworth STW in 2020 as suggested by the flow to treatment data in March 2020 (**Fig**. 6), but is not prepared to speculate on the number.

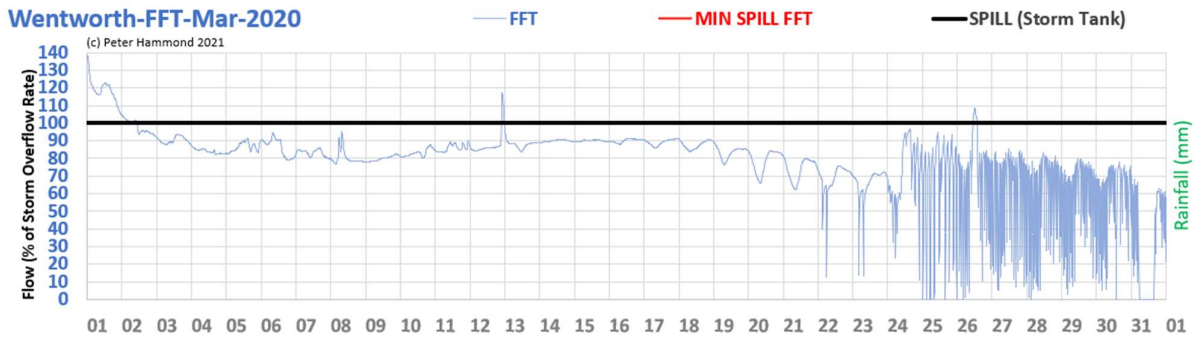


Figure 6: flow to treatment data at Wenworth STW suggests there were illegal spills in March 2020

2021

The 2021 overview for Wentworth STW (**Fig**. 7) clearly indicates unreliability of the EDM spill data until the end of May 2021.

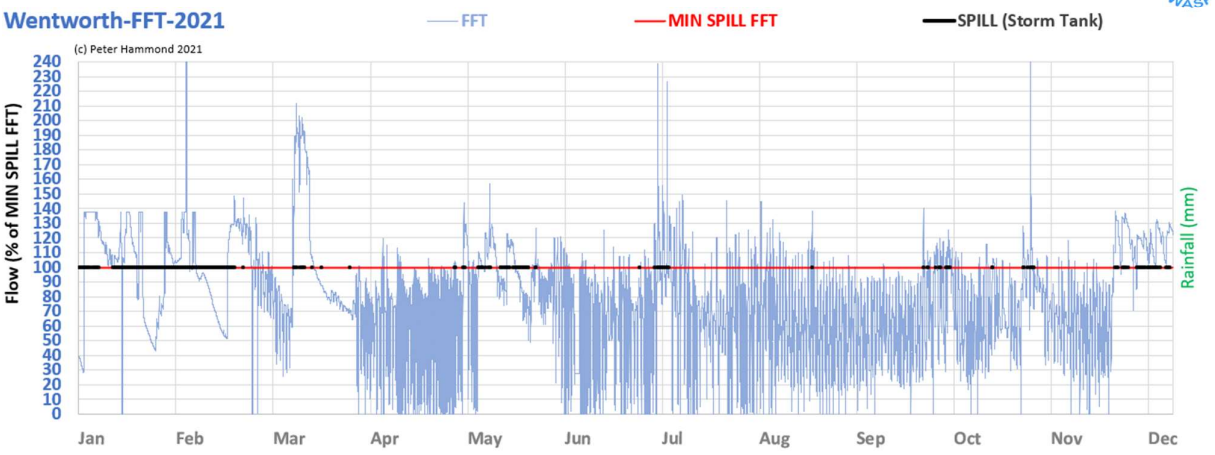


Figure 7: 2021 overview data for Wentworth STW showing flow to treatment, capacity and spill data

In its 2021 submission to the EA, YW records a "sensor failure". Presumably this is referring to the EDM device. The problem is described as being resolved in August 2021. In fact, WASP believes the EDM data is probably reliable from July 2021.

Even after the resolution of the EDM malfunction, WASP believes that Wentworth STW still made at least 5 illegal early spills in October and November 2021 (**Fig**. 8).

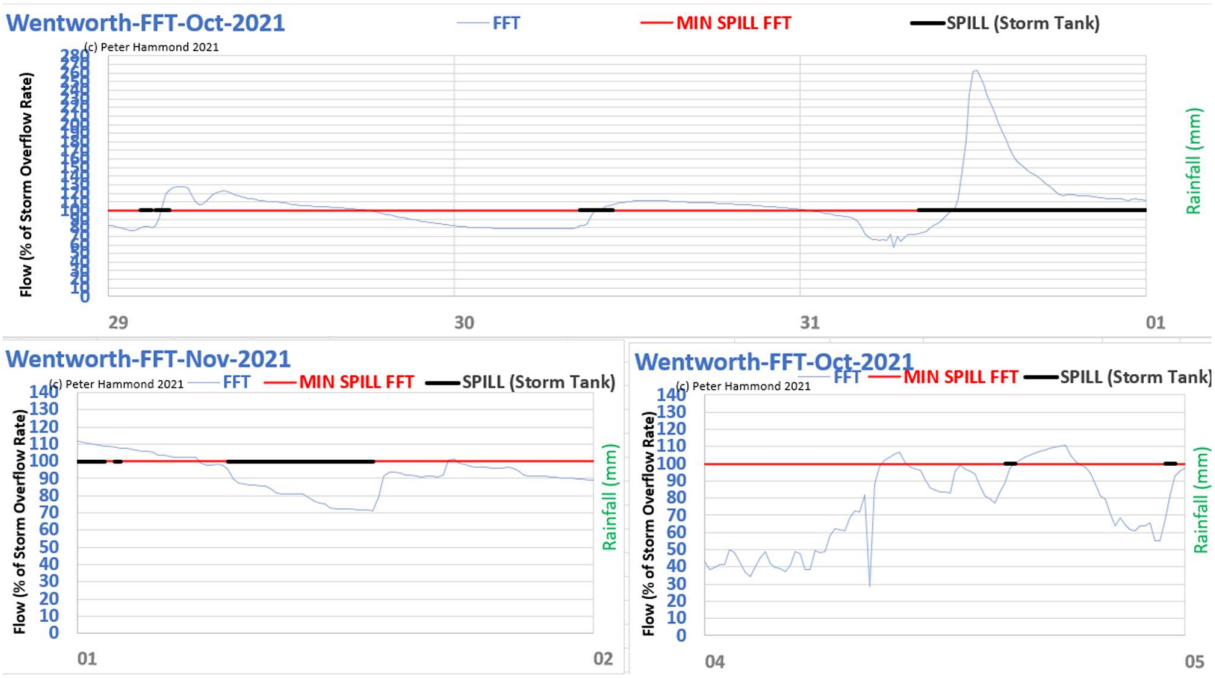


Figure 8: WASP believes there were at least 5 illegal early spilling days at Wentworth STW in 2021 (Oct 4,29-31; Nov 1)