Hanging Langford Operating Techniques Agreement

Evidence Pack

Wessex Water

May 2022

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1	Draft issued externally for comment	Ruth Barden	06/05/2022
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3			

Executive summary

The Wylye, Hanging Langford and Steeple Langford sewerage catchment suffers from high levels of groundwater infiltration, particularly to the private network, when the water table is high.

In 2010 a reed bed was constructed within Wiltshire Wildlife Trust's Langford Lakes Nature Reserve, to which storm flows are pumped from Hanging Langford pumping station. The overflow protects properties in Hanging Langford from flooding and guarantees service during high groundwater conditions, and the reed bed provides treatment for the storm flows which discharge from the reed bed to the River Wylye.

There is a direct correlation between water table level and storm overflow operation. Discussions with the EA have indicated that there is a strong case to change the permit of the storm overflow to a treated discharge, because of the existing reedbed treatment provided.

This document provides the evidence to support the application to develop an Operating Techniques Agreement to change the current settled storm overflow permit into a biologically treated discharge permit via the existing reed bed, thereby eliminating the requirement to report the discharge as an untreated intermittent discharge in regulatory reporting returns.

Contents

1. Existing Permit

In 2010 a reed bed was constructed within Wiltshire Wildlife Trust's Langford Lakes Nature Reserve, to which storm flows are pumped from Hanging Langford pumping station. The overflow protects properties in Hanging Langford from flooding and guarantees service during high groundwater conditions, and the reed bed provides treatment for the storm flows which discharge from the reed bed to the River Wylye.

Hanging Langford sewage pumping station has an existing storm overflow permit which references the reedbed, permit number NPSWQD003662

Parameter	Limit
DWF	181 m^3/d
PFF	12 l/s
Screening	6 mm
Storm storage	45 m^3
Dry weather storage duration	60 min
Reedbed maintenance	Reed density is maintained and weeds are kept to an acceptable level in the Reed Bed

Table 1: Existing permit details

The pumping station receives flows from the villages of Wylye, Hanging Langford and Steeple Langford connected to foul sewer and Hanging Langford SPS. The villages of Hanging Langford and Steeple Langford flow by gravity to Hanging Langford SPS, whereas the village of Wylye is pumped via 1.5km rising main into the Hanging Langford system from Chequers Cottages SPS. All flows from Wylye are pumped, there is no overflow at the SPS.

The pumping station pumps forward into a c.8km rising main to Great Wishford WRC for treatment.

Figure 1: Sewage Network Location Plan

The map above, Figure 1, indicates the location of the reedbed with respect to the sewage pumping station and villages served. Yellow lines on the map indicate the pumped sewers

(rising mains) whereas the red lines are the gravity sewers, predominantly within the villages of Hanging Langford and Steeple Langford.

2. Site Details

The reedbed is located approximately 1km to the east of the sewage pumping station (SPS) in the Langford Lakes nature reserve which is owned and operated by Wiltshire Wildlife Trust. The rising main runs beneath the main access road into the car park which then becomes the central visitor path through the reserve.

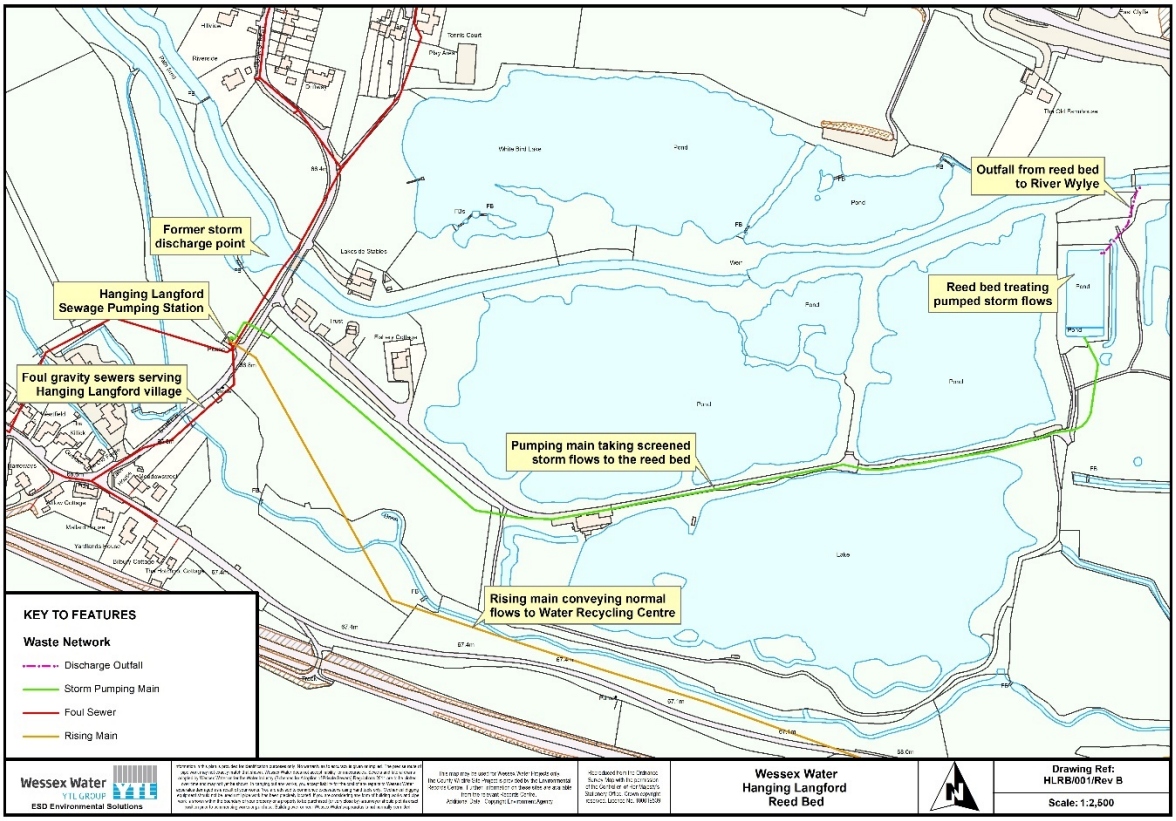


Figure 2: SPS and reedbed location plan

The reedbed was constructed in 2010-11 as part of a wider refurbishment project at the pumping station. The scheme included sewer sealing within the catchment, the construction of the 1km rising main to the reedbed and the reedbed itself.

The reedbed is 75m x 32m x 1m deep, elevated and lined with geotextile liner, over compacted sand, to prevent groundwater infiltration. The screened inlet chamber flows into an open section, c.5m long and 0.5m deep, before there is a gabion wall and reedbed section.

Phragmites reeds were planted at a density of 4 plants/m^2 into c.30cm substrate/subsoil with c.30cm to top water level, when designed.

Retention time is 12 hours at peak flow but considerably longer in the summer when the water table recedes. When constructed the ability to pump potable water from the SPS to the reedbed was included to prevent the plants drying out in the summer months, however this facility is seldom used due to the levels of groundwater ingress year round.

3. Spill Frequency Information

3.1 Overview of the sewerage system

The public sewerage network within the Wylye Valley is prone to groundwater infiltration and has been extensively sealed since 2010. Despite this, high flows in wet winters continue to enter the sewers. The villages are served by foul/combined sewerage system, there is no separate surface water drainage within the village – the small section which exists in Steeple Langford later connects to the foul public sewer.

Public to private sewer length ratio is approx. 1:2.5, with a greater length of private drains from properties into the public sewer. A number of properties appear to have private systems, e.g. Rainbow pub, East Clyffe and West Clyffe farms, as show in figure 3.

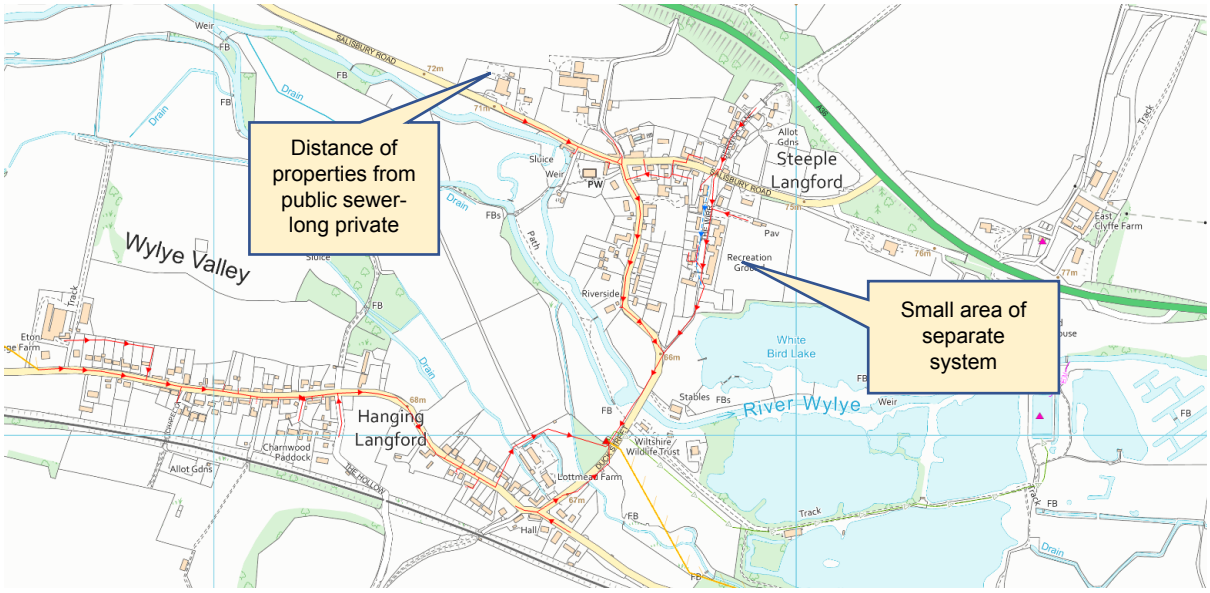


Figure 3: Sewerage detail of Hanging Langford and Steeple Langford, where red lines represent the foul/ combined gravity public sewers and blue lines show surface water sewers. No private pipework is shown.

3.2 Spill Frequency

Spill frequency information using Event Duration Monitoring (EDM) data for the last three years is shown in Table 2 below. The frequency has been calculated using the standard EA 12-24hr methods to capture spill events.

Year	Total duration (hours)	Frequency (12-24hr)
2019	1,020	360
2020	1,541	346
2021	1,014	337

Table 2: Spill frequency data 2019-21

The spill data is reflective of the weather in the years listed, and the corresponding groundwater levels. As can be seen in Figure 4 below, 2020 was the wettest year of those shown, and according to Wessex Water data, the wettest since 2014. In 2019 the recorded

rainfall levels were 75mm above the long term average, and 2020 recorded rainfall levels of 100mm above the long term average.

In 2021, May was the wettest month at almost 200% of its long term average (LTA). March, April and November were exceptionally dry months, November in particular with around 25% of its LTA. The provisional UK rainfall total was 1077mm, 93% of the 1991-2020 average. Storm Arwen caused significant disruption to the UK in late November with an issued Red Warning. There were 5 named storms that hit the UK in 2021.

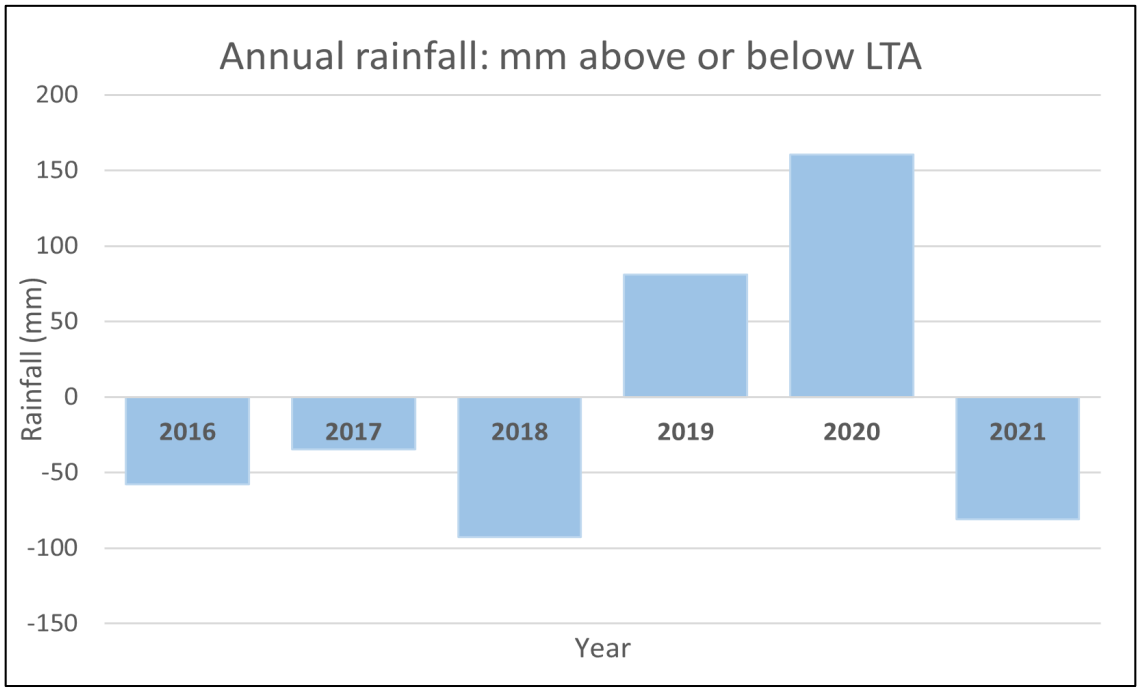


Figure 4: Annual rainfall data.

Similar patterns can be seen in the groundwater data, although often slightly suppressed. At our observation borehole in Tilshead, nr Warminster, we recorded the highest ever winter groundwater levels between October and December 2019 – significantly above the LTA

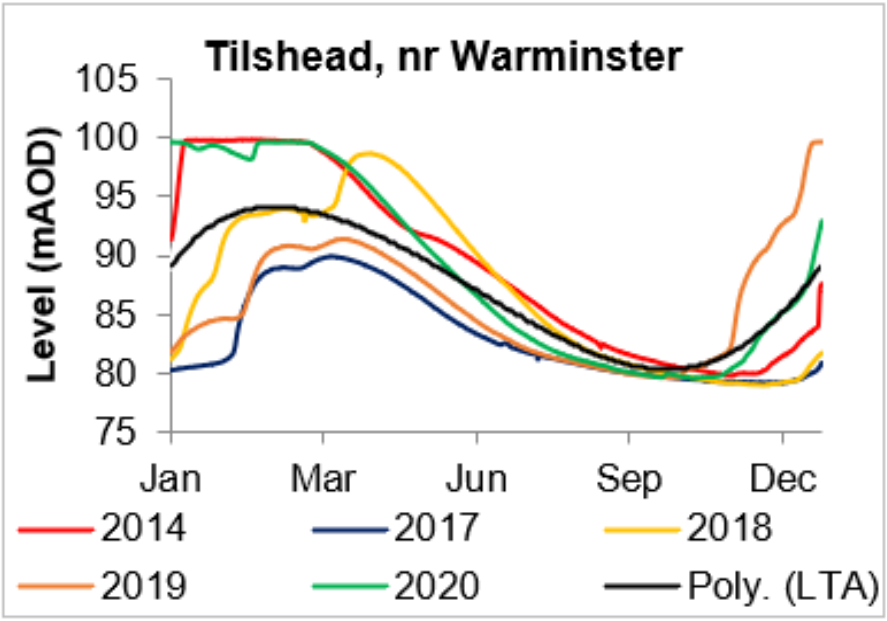


Figure 5: Groundwater levels at Tilshead 2014-2020

Figure 6 below illustrates groundwater levels compared to long term trends between exceptionally high and exceptionally low, up the end of 2021. Whilst this shows groundwater levels from observation boreholes more widely across our region, Tilshead is close to Hanging Langford. The water table in spring 2020 was considered exceptionally high, whereas it was above normal around May 2021.

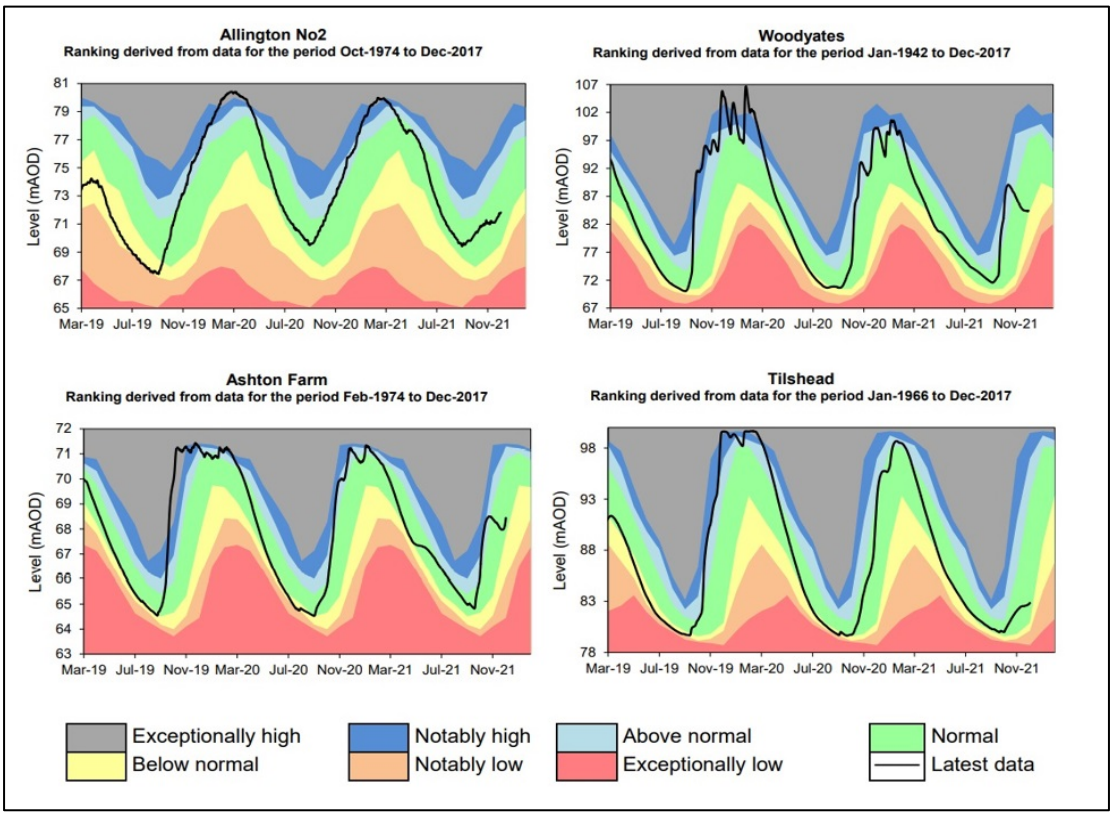


Figure 6: Groundwater levels across the WW region 2019-2021

4. Photos

Photo 1: Samples taken on 17/02/22 when overflow was in operation: River Wylye river water upstream of the reedbed on the left and influent to the reedbed on the right.

Photo 2: Hanging Langford pumping station, pumping flow to Great Barford WRC for treatment, and overflowing to the reedbed located on Langford Lakes Nature Reserve ‘Hanging Langford reedbed’

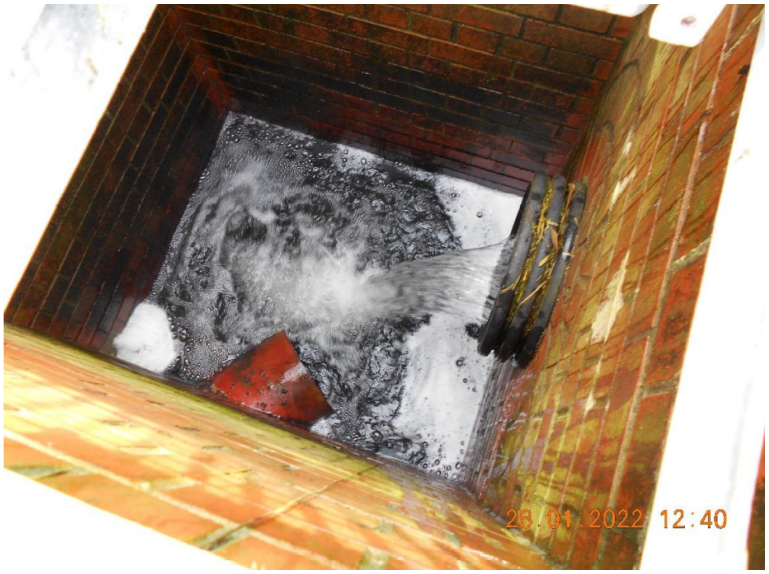


Photo 3: Discharging outfall from the reedbed at Hanging Langford on 28/01/2022.

Photo 4: Receiving watercourse (River Wylye) at the outfall on 28/01/2022.

5. Environmental Context (River Wylye SSSI)

The Hanging Langford reedbed discharges to the River (Middle) Wylye, a Water Framework Directive waterbody, as shown in the map below:

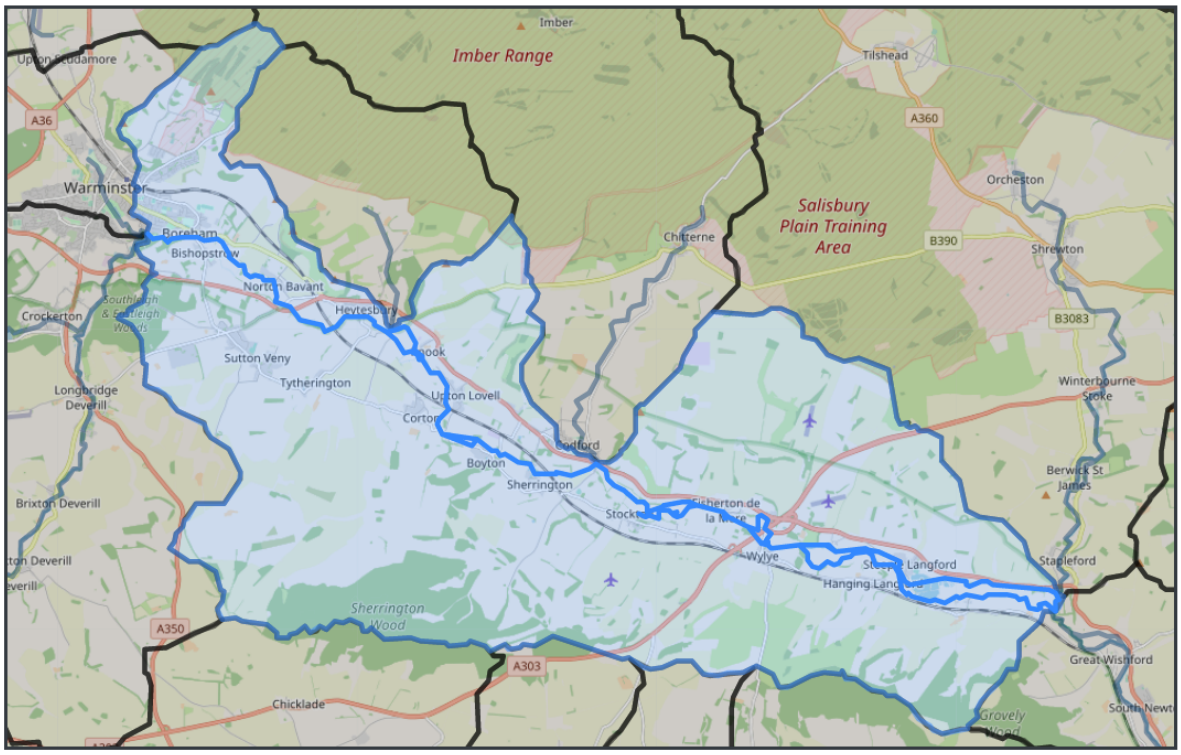


Figure 7: River (Middle) Wylye. Source: EA Catchment Data Explorer: Wylye (Middle) | Catchment Data Explorer | Catchment Data Explorer

This is a Chalk Stream which is designated as a Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC) under the Habitats Directive. The features of interest are: classic chalk stream plant communities of water crowfoot (*Ranunculus spp.)* and starwort (*Callitriche spp.*), the Wylye is noted for its wild brown trout (*Salmo trutta*) and grayling (*Thymallus thymallus*) populations, as well as abundant hatches of river flies. Much of the river is managed as a wild trout fishery although some reaches are stocked with triploid brown trout

The waterbody is currently classified as Moderate status, primarily for macrophytes and phosphorus, when last reported in 2019. Many of the elements have been recorded as High status, such as fish, invertebrates, ammonia and dissolved oxygen, for example. Details of the latest (2019) classification status are detailed below:

Classification Item	2013	2014	2015	2016	2019
Fish	High	High	High	Moderate	High
Invertebrates	High		High	High	High
Macrophytes and Phytobenthos Combined	Poor	Poor	Moderate	Moderate	Moderate
Ecological	Poor	Poor	Moderate	Moderate	Moderate
Biological quality elements	Poor	Poor	Moderate	Moderate	Moderate
Fish	High	High	High	Moderate	High
Invertebrates	High		High	High	High
Macrophytes and Phytobenthos Combined	Poor	Poor	Moderate	Moderate	Moderate
Physico-chemical quality elements		Moderate	Moderate	Moderate	Moderate
Ammonia (Phys-Chem)		High	High	High	High
Dissolved oxygen		High	High	High	High
Phosphate		Moderate	Moderate	Moderate	Moderate
Temperature		High	High	High	Good
pH		High	High	High	High

Figure 8: Current WFD Classification Status

The hydrology and morphology are currently classified as supporting Good status. Like most watercourses across the country, the Wylye fails for chemical status due to levels of mercury and Polybrominated diphenyl ethers (PBDE). These are considered by the EA to be ubiquitous, man-made chemicals which affect most watercourses.

5.1 Invertebrate assessment

Invertebrate kick samples were taken during a site visit on 28/01/2022. Due to access issues, only a single macroinvertebrate sample was collected 250m downstream of the outfall from the reedbed into the river Wylye. The sample collected achieved 'Good' BMWP status based on the macroinvertebrate community present (table 3).

There was a moderate NTaxa however, the majority of taxa identified were in low abundances. The ASPT was also low suggesting a lack of pollution sensitive taxa. The sample was dominated by the northern caddisfly (*Limnephilidae*) with 421 specimens present in the sample. The next most dominant taxa were freshwater shrimp (*Gammaridae*), freshwater hoglice (*Asellidae*) and midge larvae (Chironomidae) with counts of 75, 71 and 46, respectively. The remaining 14 taxa were in abundances of 13 or below, including 13 small mayflies (*Baetidae*). A single top-scoring taxa was identified: two long-horned caddisfly (*Leptoceridae*).

Biotic indices	
	Downstream
BMWP (TL1)	73 ('Good')
NTAXA (TL1)	17
ASPT (TL1)	4.29
WHPT (TL2)	92.8
NTAXA (TL2)	18
ASPT (TL2)	5.16

Table 3. Results of macroinvertebrate kick samples downstream of the reedbed outfall, Jan 2022.

6. Water quality Impact

Following the construction of the reedbed in 2011 routine water quality sampling was undertaken of the reedbed influent and effluent, in addition to River Wylye upstream and downstream water quality analysis. The 5-year average data collected after reedbed construction (2011-2016) is presented below in tables 4 and 5.

a) Reedbed performance

Average	E-Coli (cfu/ 100ml)	Enterococci (cfu/100ml)	Orthophosphate (mg/l)	Suspended solids (mg/l)
Influent	101,264	10,249	0.58	15
Effluent	82	40	0.29	1.6

b) River water Quality

Average	E-Coli (cfu/ 100ml)	Enterococci (cfu/100ml)	Orthophosphate (mg/l)	Suspended solids (mg/l)
Upstream	6,600	1,013	0.09	13.7
Downstream	615	224	0.1	15.6

Tables 4 and 5: 5-year average water quality sampling data taken following post construction in 2011, indicating that the reedbed effluent has a diluting effect on the downstream river.

More recent sampling has indicated a lower level of performance from the reedbed with respect to ammonia, however, the water quality is still within typical sewage treatment works final effluent sanitary permit standards, which would be:10:30:20 (ammonia:suspended solids:BOD).

Concentration (mg/ l)	Ammonia		Suspended Solids		BOD	
Date	Influent	Effluent	Influent	Effluent	Influent	Effluent
30/07/2020	11.8	10.7	279	5	91	2
03/11/2021	4.74	6.28	14	5		
07/12/2021	5.64	8.13	15	5		
12/01/2022	8.1	7	41	5		
08/02/2022	9.75	6.17	33	5		
08/03/2022	4.26	8.08	9	5		

Table 6: recent water quality sampling data from the reedbed influent and effluent

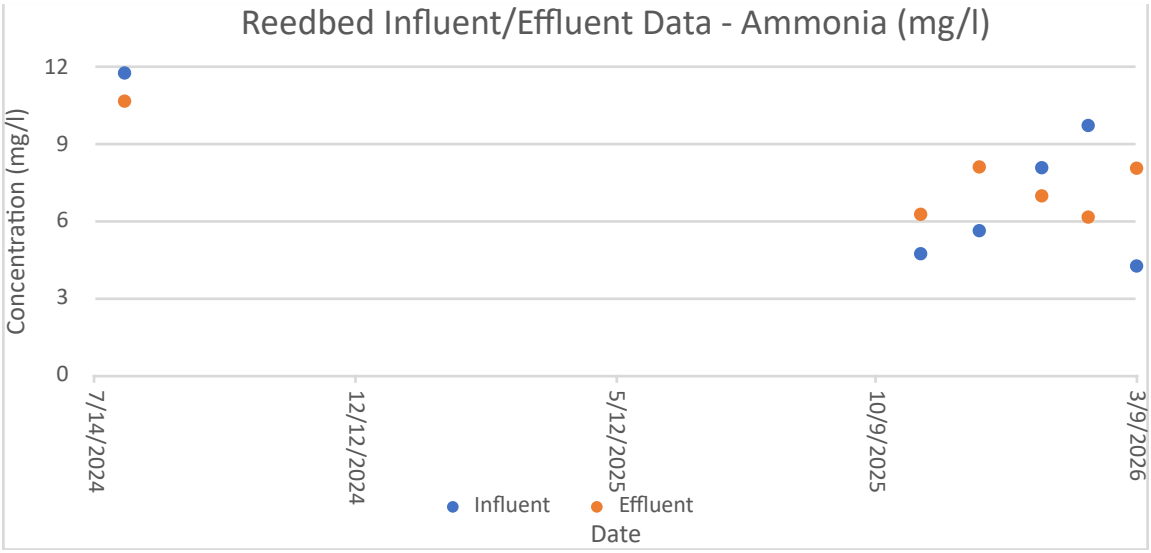


Figure 9: Reedbed influent and effluent ammonia concentrations (mg/l)

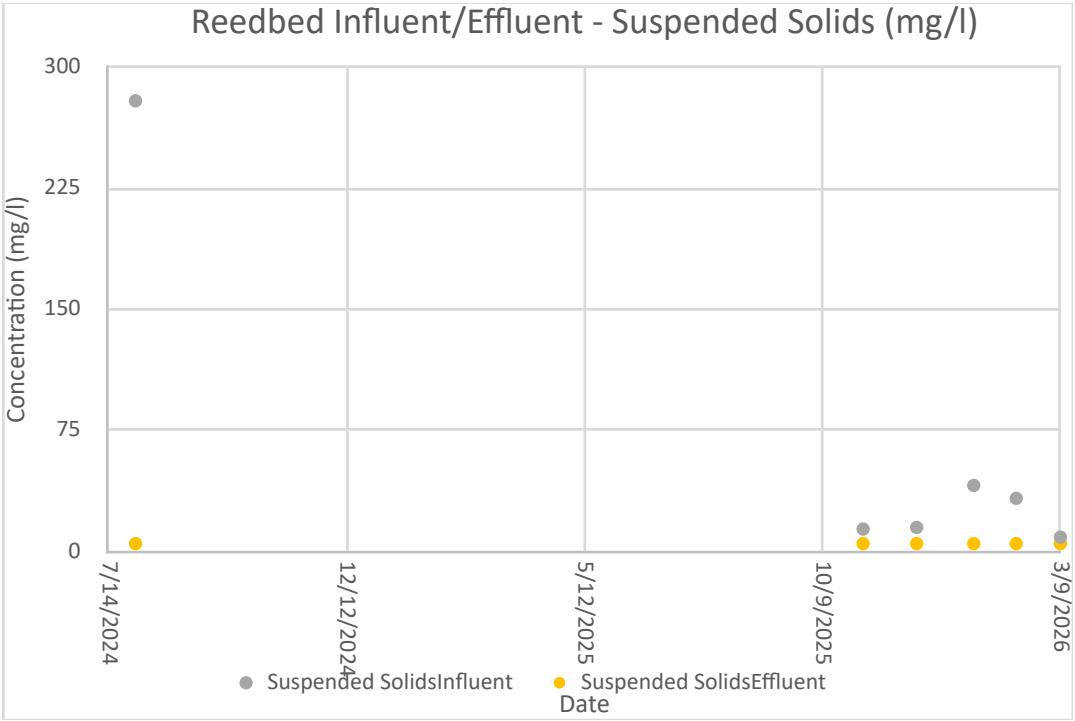


Figure 10: Reedbed influent and effluent suspended solids concentrations (mg/l)

Data has also been collected on the reedbed performance against bacterial reduction. Whilst the downstream River Wylye is not known to be used recreationally at this location, the bacterial levels show a good level of reduction across the reedbed, further demonstrating the effectiveness of this as a treatment solution.

Concentration (per 100ml)	E.Coli		Intestinal Enterococci	
Date	Influent	Effluent	Influent	Effluent
30/07/2020	540000	1100	100000	3900
03/11/2021	420000	51000	160000	47000

07/12/2021	540000	520	77000	430
12/01/2022	1300000	3200	300000	1600
08/02/2022	1000000	1000	160000	410
08/03/2022	160000	30	20000	20

Table 7: Recent data showing bacteriological reduction across the reedbed

These data indicate that the reedbed is on average providing a greater than 90% removal of both E.Coli and Intestinal Enterococci across the process.

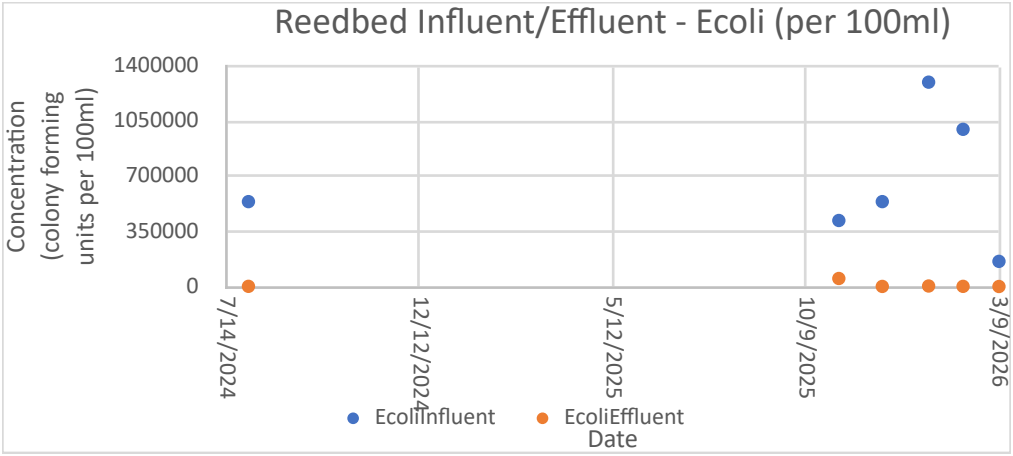


Figure 11: Reedbed performance for EColi reduction between influent and effluent

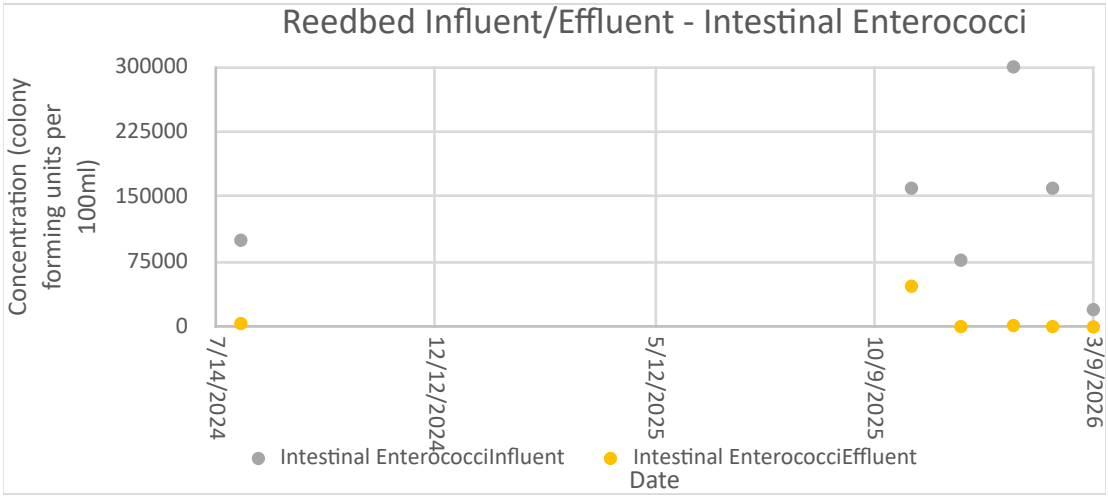


Figure 12: Reedbed performance for Intestinal Enterococci reduction between influent and effluent

It should be noted that the reedbed is scheduled for a major refurbishment during 2023 to replace media and reeds where required, and to enable improved flow through the reedbed. This is standard maintenance which is required at reedbeds every 10 to 15 years.

Water Quality Update – August 2023

Reedbed Performance

We have been undertaking more intensive water quality sampling of the reedbed influent, effluent and the River Wylye upstream and downstream of the discharge point to understand

both the performance of the reedbed and environmental impact. Parameters include the standard sanitary determinands: BOD, suspended solids and ammonia; with the addition of E.Coli and Intestinal Enterococci and total phosphorus. The graphs below reflect the more intensive monitoring undertaken since January 2023.

The groundwater influenced storm overflow stopped operating on 2nd June 2023 when the water table receded and no flow has been witnessed since that date, therefore, water quality data is shown from January to June 2023.

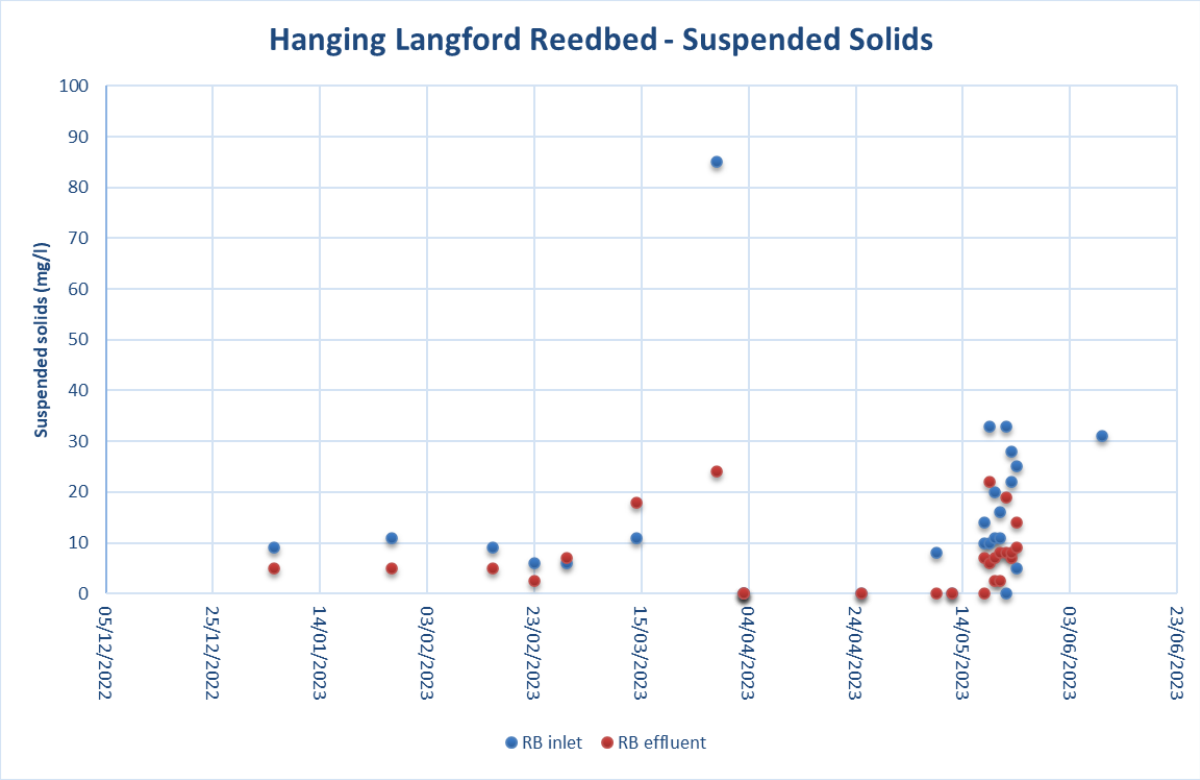


Figure 13: Reedbed influent and effluent suspended solids concentrations (mg/l), Dec 2022 – June 2023. Note 7-day intensive sampling period between 18th -24th May 2023.

The average influent suspended solids concentration is 33mg/l, with a removal of 44%, to achieve a reedbed effluent concentration of 8.73mg/l. For reference, a 'typical' WRC final effluent suspended solids permit would be 30mg/l as a 95%ile. This is the case for both Warminster and Wishford WRCs, which are upstream and downstream of Hanging Langford, respectively, also discharging to the River Wylye with permit limits of 30mg/l for suspended solids. This demonstrates very effective suspended solids removal from the reedbed treatment system but also highlights the low concentration of suspended solids in the reedbed influent due to the high degree of dilution from groundwater ingress.

As part of the greater resolution monitoring undertaken during 2023 to date, we have analysed for bacterial contaminants. Figure 14 highlights the reedbed influent and effluent E.Coli concentration, as colony forming units per 100ml (cfu/100ml). Similarly, this illustrates a very good level of removal across the reedbed.

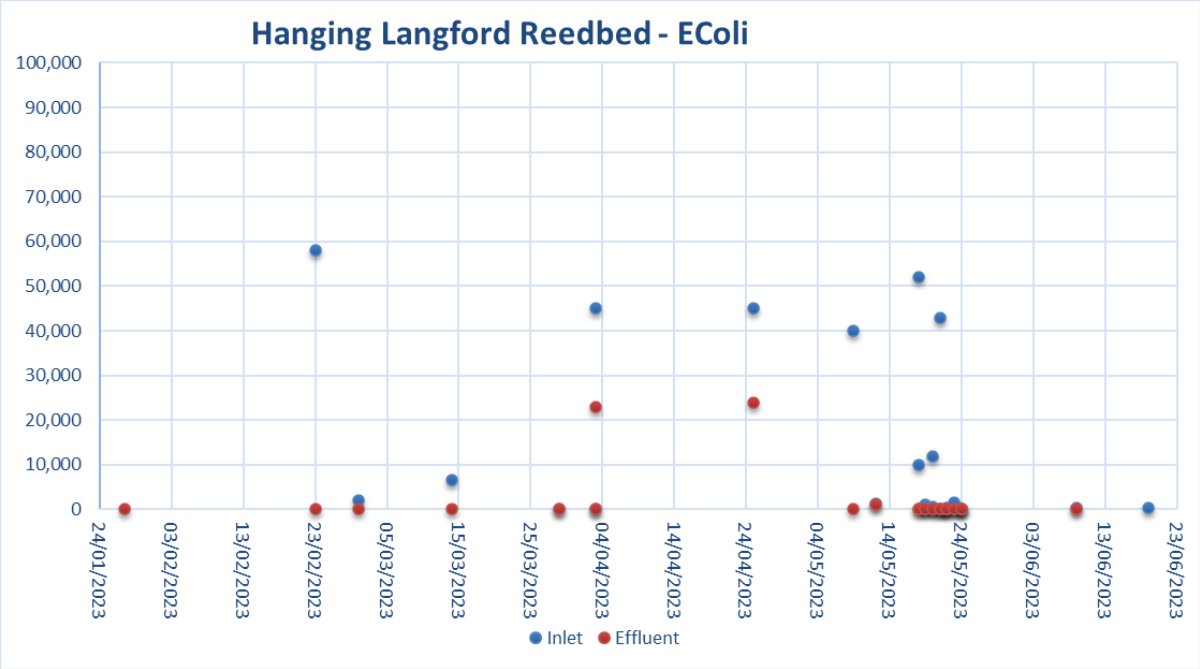


Figure 14: Reedbed influent and effluent E.Coli concentrations, Jan – June 2023. 05/01/23 and 27/01/23 influent sample results not shown, result were 380,000/100ml. Note 7-day intensive sampling period between 18th -24th May 2023.

The average influent E.Coli concentration (since Jan 23) is 40,040cfu/100ml, with a removal rate of 85%, to achieve an average effluent concentration of 1,888cfu/100ml. For context, our recent AMP7 Bathing Water Ambition investigations (2 years data) monitored the E.Coli concentration at 9 coastal WRCs discharging to designated Bathing Waters, the comparative data is:

- Coastal WRC crude E.Coli range: 2,500,000 – 8,000,000cfu/100ml
- Coastal WRC effluent E.Coli range: 20 – 190,000cfu/100ml
- Average removal rate: 80 – 99.99%

This illustrates that the removal rate from the reedbed is significant in terms of bacterial reductions. It should be noted that the River Wylye is not a designated inland bathing water with no current need to deliver UV reduction at ay of the upstream or downstream assets.

Receiving Watercourse

In addition to the influent and effluent monitoring, we have been undertaking sampling of the River Wylye upstream and downstream of the reedbed discharge location.

Figure 15 highlights the upstream and downstream total phosphorus concentrations recorded to date during 2023, illustrating little difference in concentration.

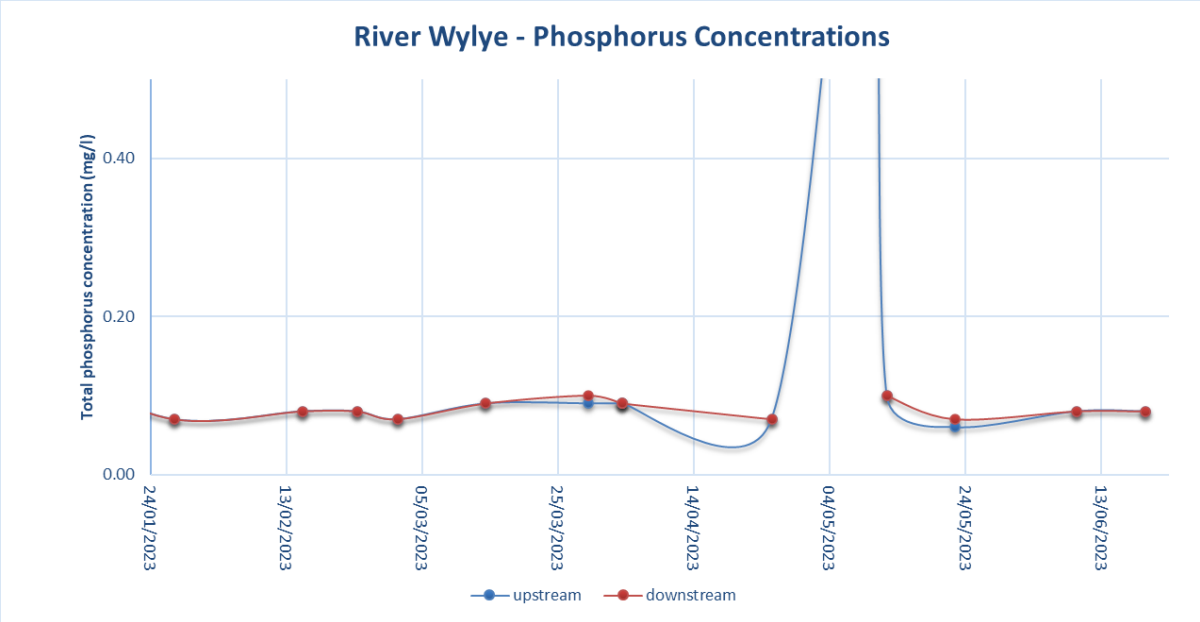


Figure 15: River Wylye Total phosphorus concentrations (mg/l), Jan – June 2023. Note high upstream concentration recorded on the 9th May (0.97mg/l).

There is little difference between these concentrations indicating that the treated storm overflow has no impact on riverine total phosphorus concentrations, in many cases the upstream and downstream readings are identical. The influent and effluent reedbed data indicates a small level of total phosphorus removal which is most likely related to the particulate phosphorus adhered to sediments within the influent and so reflects the level of suspended solids removal rather than a significant phosphorus reduction. Average reedbed influent total phosphorus concentration is 1.7mg/l, with an average effluent concentration of 1.4mg/l.

Upstream and downstream ammonia concentrations illustrate a similar picture to total phosphorus concentrations, with limited difference between the data, as illustrated in Figure 16, below. There is a small level of ammonia reduction across the reedbed with average influent ammonia concentrations during 2023 of 8.6mg/l and average effluent of 1.5mg/l.

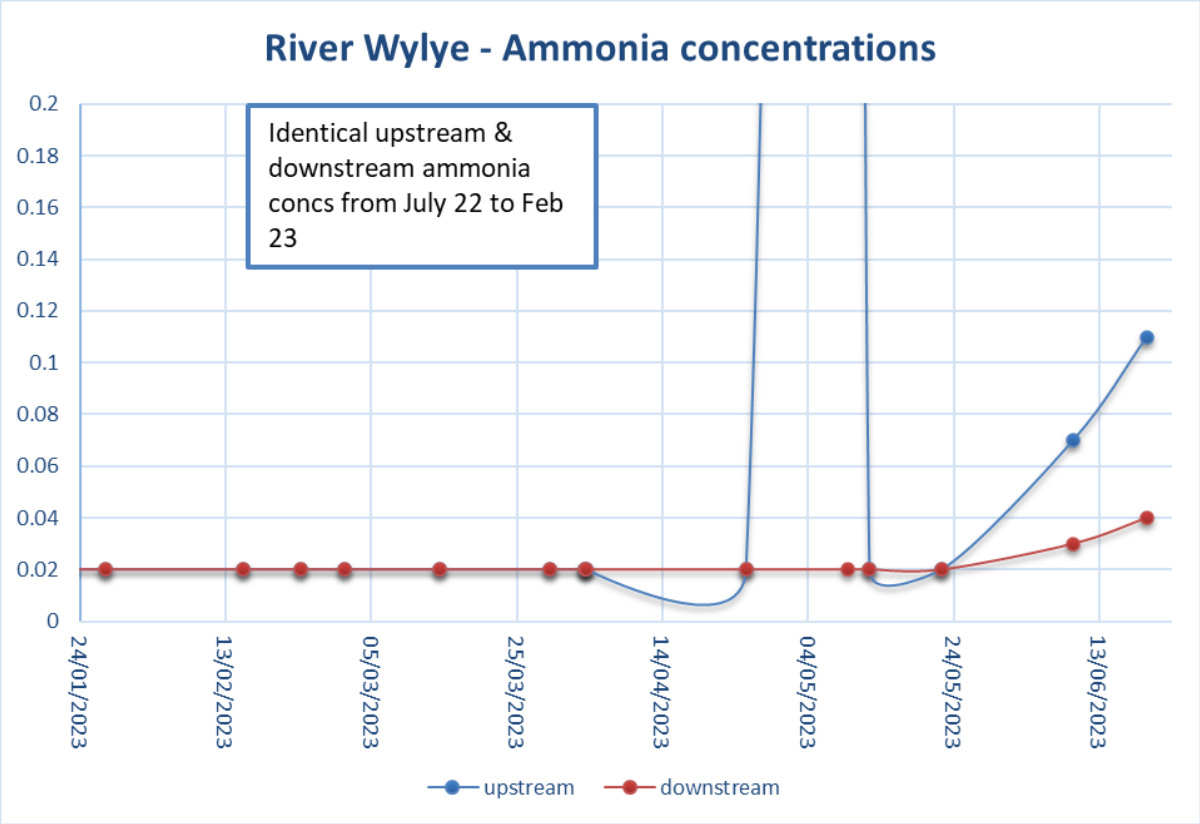


Figure 16: River Wylye ammonia concentrations (mg/l), Jan – June 2023. Note the high upstream concentration on 9th May (2.27mg/l)

Despite the high level (85%) of EColi removal across the reedbed there is only a small reduction in the downstream concentration in the River Wylye during 2023, as shown in Figure 17. This is due to the differences in flow, with a significantly higher river flow than from the reedbed, preventing the lower concentration effluent having a significant impact on overall river E.Coli concentrations.

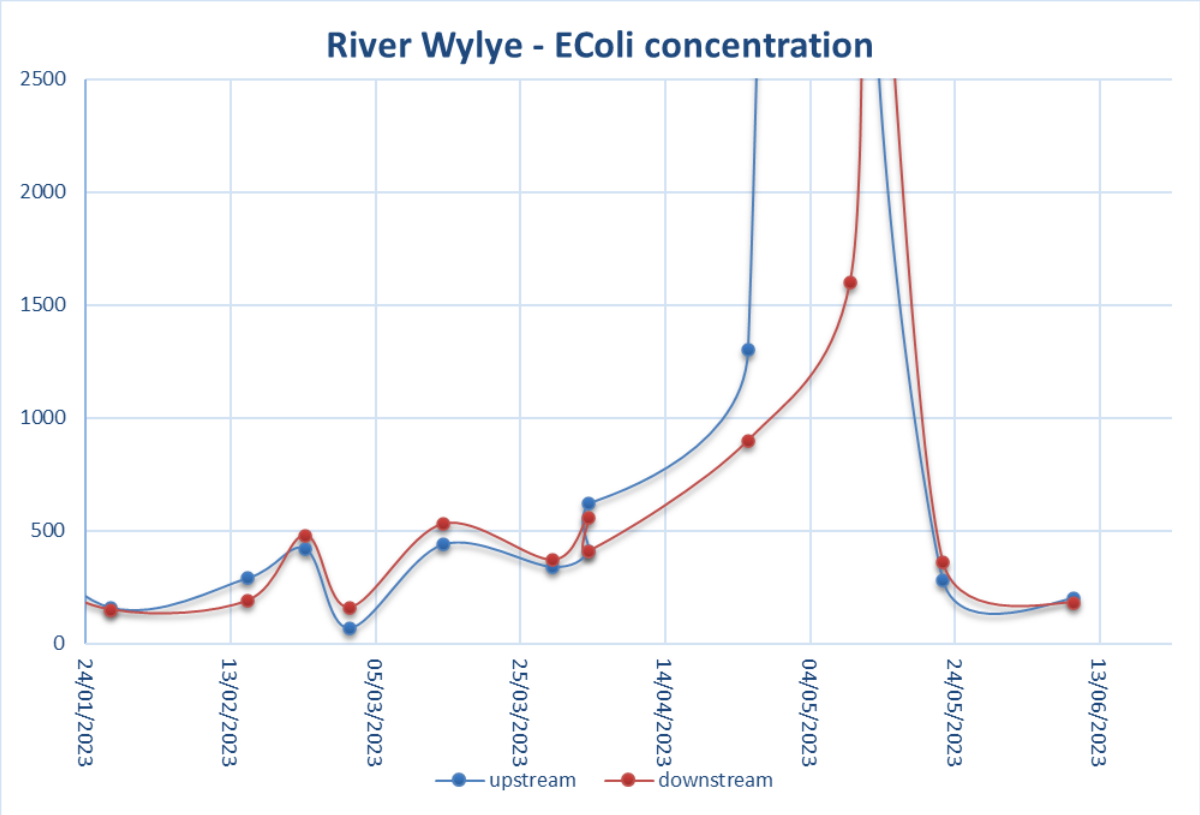


Figure 17: River Wylye E.Coli concentrations (cfu/100ml), Jan – June 2023. Note high concentrations recorded on the 9th May (31,000 upstream and 1,600cfu/100ml downstream).

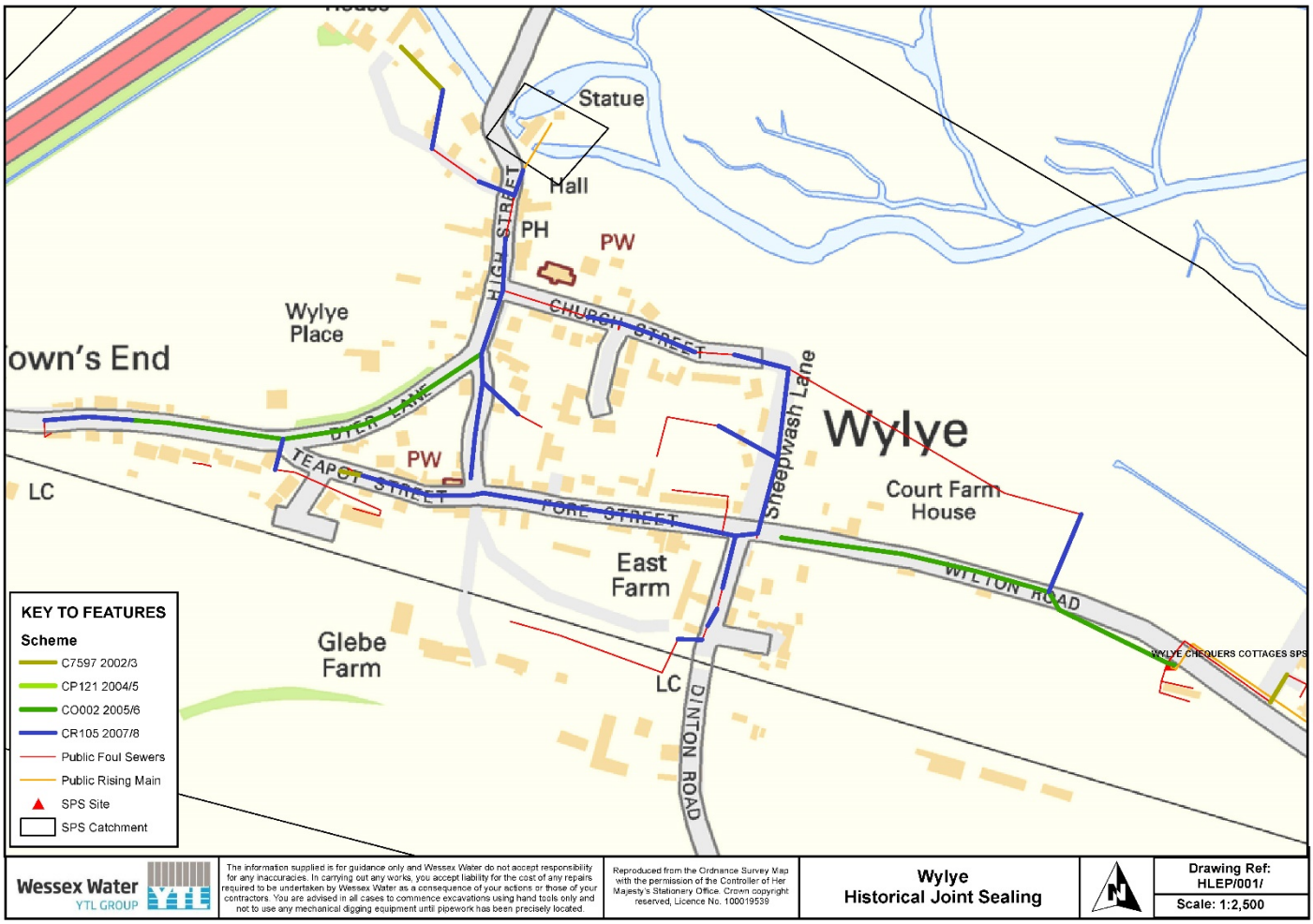
7. Sewerage Maintenance – historical and ongoing

7.1 Background

Wylye and Hanging Langford both lie in the Wylye Valley and are heavily impacted by groundwater infiltration, which can lead to sewer flooding and loss of service to customers during the winter months. See here for video explaining this phenomenon.

Between the year 2000 and 2009 extensive efforts were made to reduce infiltration in the Wylye and Hanging Langford pumping station catchments. At that time, Wessex Water used polyester and acrylate gel extensively to seal defective joints across our operating region and it was effective at reducing groundwater infiltration in Wylye and Hanging Langford for a short period of time. However, it is believed that the seasonal expansion and contraction of the pipework meant that over time cracks formed around the gel, so the infiltration returned. A more lasting solution was required.

Plan 1. Sewers in Wylye which had joints sealed between 2002 and 2008 using acrylate or polyester



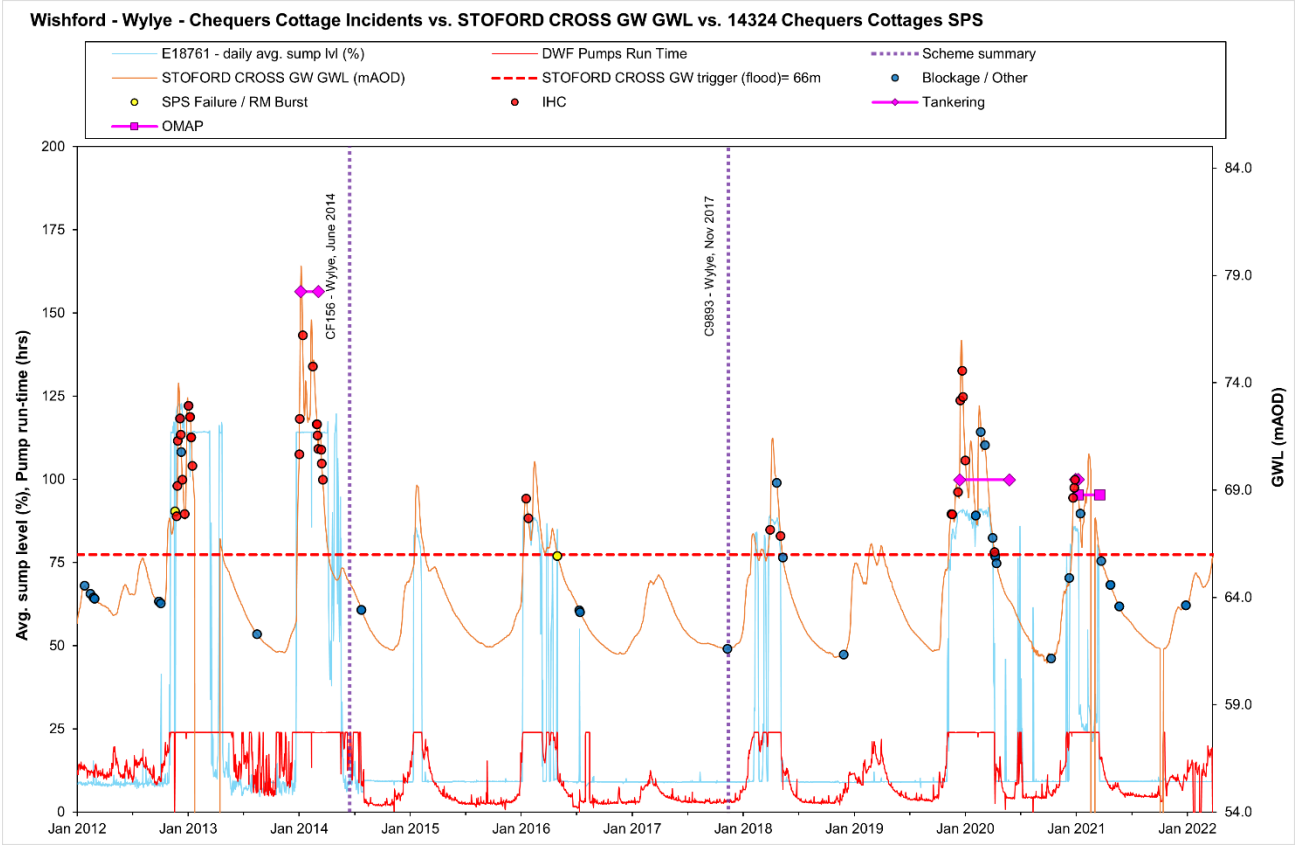
gel.

Plan 2. Sewers in Hanging Langford which had joints sealed between 2002 and 2008 using acrylate or polyester gel.

Loss of service incidents (e.g customers not able to flush downstairs toilets and flooding) were reported in Wylye and Hanging Langford during the exceptionally wet winter of 2013/14, necessitating the use of tankers to remove excess groundwater from the sewer network, and restore service to customers. This recurrence of groundwater inundation in Wylye and Hanging Langford resulted in their inclusion in Wessex Water's regional Infiltration Reduction Programme. Work under the programme has involved sewer surveys to identify points of groundwater ingress, followed by sewer sealing to address the defects. Sealing now relies on Cured In Place Pipe (CIPP) lining which is known to increase the operational lifetime of the pipe length and completely stop groundwater infiltration, by forming a new watertight sewer inside the old leaking pipe.

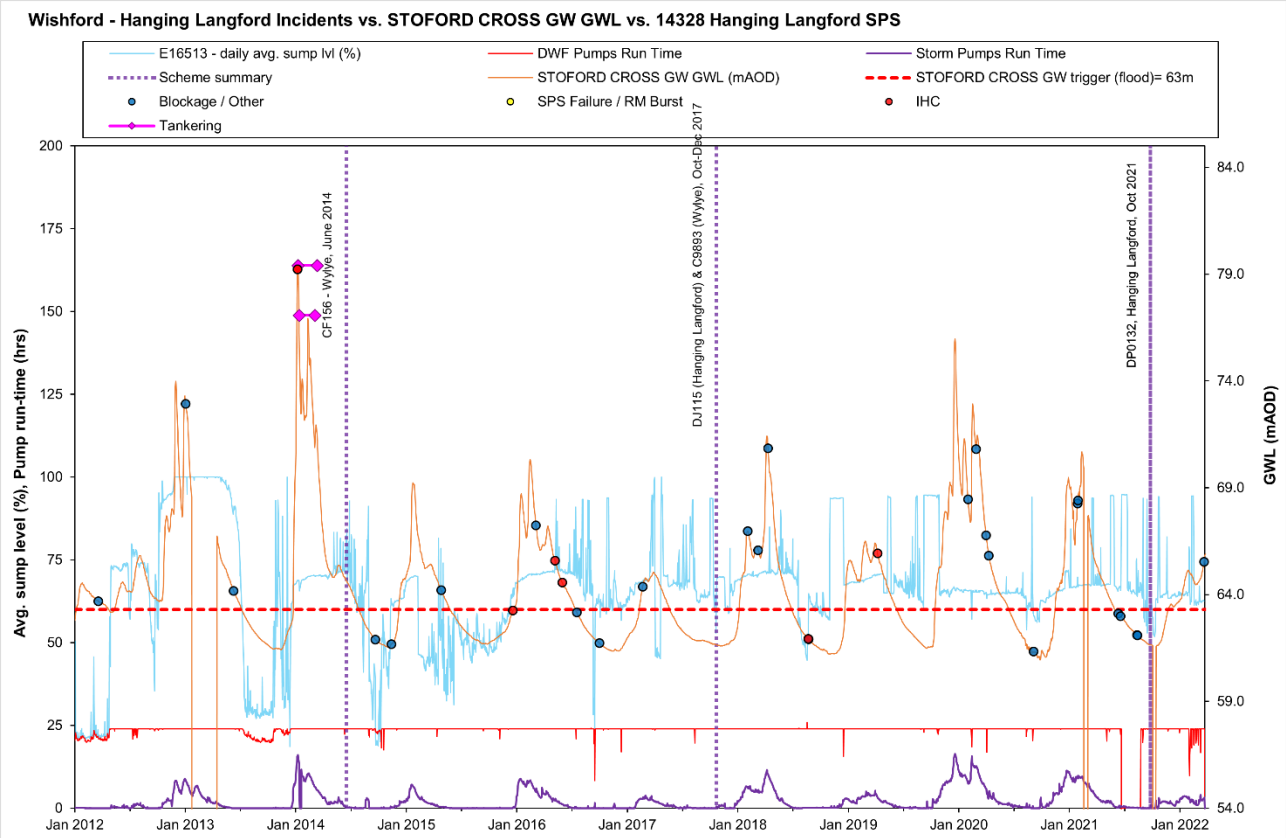
7.2 Telemetry

The following graphs show pumping station sump level telemetry against groundwater level (GWL) recorded at an EA observation borehole (Stoford Cross). The graphs show sewerage incidents (flooding or loss of service) reported by customers as well as rainfall, and an indication of pump run time. The GWL at Stoford Cross has been used to determine a groundwater trigger level for preparedness to support our operational response to groundwater induced sewer flooding.



Graph 1. Wylye, Chequers Cottage SPS sump level in light blue, shown during winters to jump to 80 - 100% for extended periods. In red, note the periods of constant pump run time. The orange line is the GWL at Stoford Cross borehole. Sewerage incidents attributed to Inadequate Hydraulic Capacity (IHC) are shown as red dots, with periods of tankering or over pumping shown as pink lines.

The telemetry in the above graph clearly shows that the Chequers Cottage SPS (14324) sump level is influenced by the ground water level. The graph suggests that groundwater infiltration in the network is most significant once the Stoford Cross groundwater level exceeds 66 mAOD. During the winters of 2016/17 and 2018/19 the Wylye catchment did not record any incidents due to inadequate hydraulic capacity (IHC) and the pumps at Chequers Cottage SPS (14324) coped with the inflow. In 2015/16 and 2019/20 the ground water level was recorded at 68 mAOD or higher, and the pumps were unable to cope with the inflow and incidents due to IHC were reported.



Graph 2. Hanging Langford SPS sump level in light blue, shown during winters to jump to 70 - 90% for extended periods (70% coinciding with the storm weir level). In red, dry weather flow pump to the WRC run time show constant pumping for this SPS. Storm pump run time is shown in purple, and follows the GWL trend at Stoford Cross, the orange line. Sewerage incidents attributed to Inadequate Hydraulic Capacity (IHC) are shown as red dots.

The telemetry in the above graph (2) clearly shows that the Hanging Langford SPS (14328) sump level is also influenced by the groundwater level. The graph suggests that infiltration in the network is occurring for most of the year, although most especially once the Stoford Cross GWL rises above 65 mAOD. The catchment clearly suffers badly from groundwater inundation, and because this occurs even in the summer months, ingress from the River Wylye is suspected.

7.3 Infiltration Related Activity

Wylye and Hanging Langford both continue to suffer from groundwater inundation, and there remains a risk of sewer flooding or loss of service despite the pumped storm overflow. During the winter of 2013/14 it was possible to manage the risk of sewer flooding in both locations using tankers to remove excess groundwater from the pumping stations themselves, however over pumping to the environment was also considered. Following the exceptionally wet winter of 2013/14 the Environment Agency issued the Regulatory Position Statement (RPS) 'Discharge made from Groundwater Surcharged Sewers' and asked sewerage companies to develop and agree Infiltration Reduction Plans for high risk catchments. Wessex Water welcomed this statement as it sought to bring a pragmatic balance between protecting properties from flooding, protecting the environment and trying to resolve the root cause of the problems.

An Infiltration Reduction Plan (IRP) for the Great Wishford WRC catchment was produced and shared with the EA in response to the RPS. The IRP is updated annually and contains:

- Background information
- Historical and last years activities and performance
- Action Plan
- Operational mitigation action plans

The IRP contains two Operational Mitigation Action Plans (OMAPs) for Chequers Cottage SPS (Wylye) and for Hanging Langford SPS (Hanging and Steeple Langford). These detail how our Operations teams may use tankers or in other circumstances over pump the sewer network to the environment to protect properties from flooding and prevent loss of service.

Tankers were used at Chequers Cottage SPS during winter 2019/20 to prevent sewer flooding and loss of service, and during winter 2020/21, the OMAP for Wylye was initiated with excess groundwater pumped to the environment between January and March 2021. Tankering at Hanging Langford has been carried out at different times to support survey and maintenance tasks but is not usually required to prevent flooding or loss of service due to the operation of the pumped storm overflow to the reedbed.

The IRP Action Plan for Infiltration Reduction has Short, Medium and Long term objectives. Annual updates to the IRP contain details of works within financial year, as well as progress updates to the Action Plan. The following table is a summary of Infiltration Reduction efforts for Wylye and Hanging Langford since the IRP was first produced:

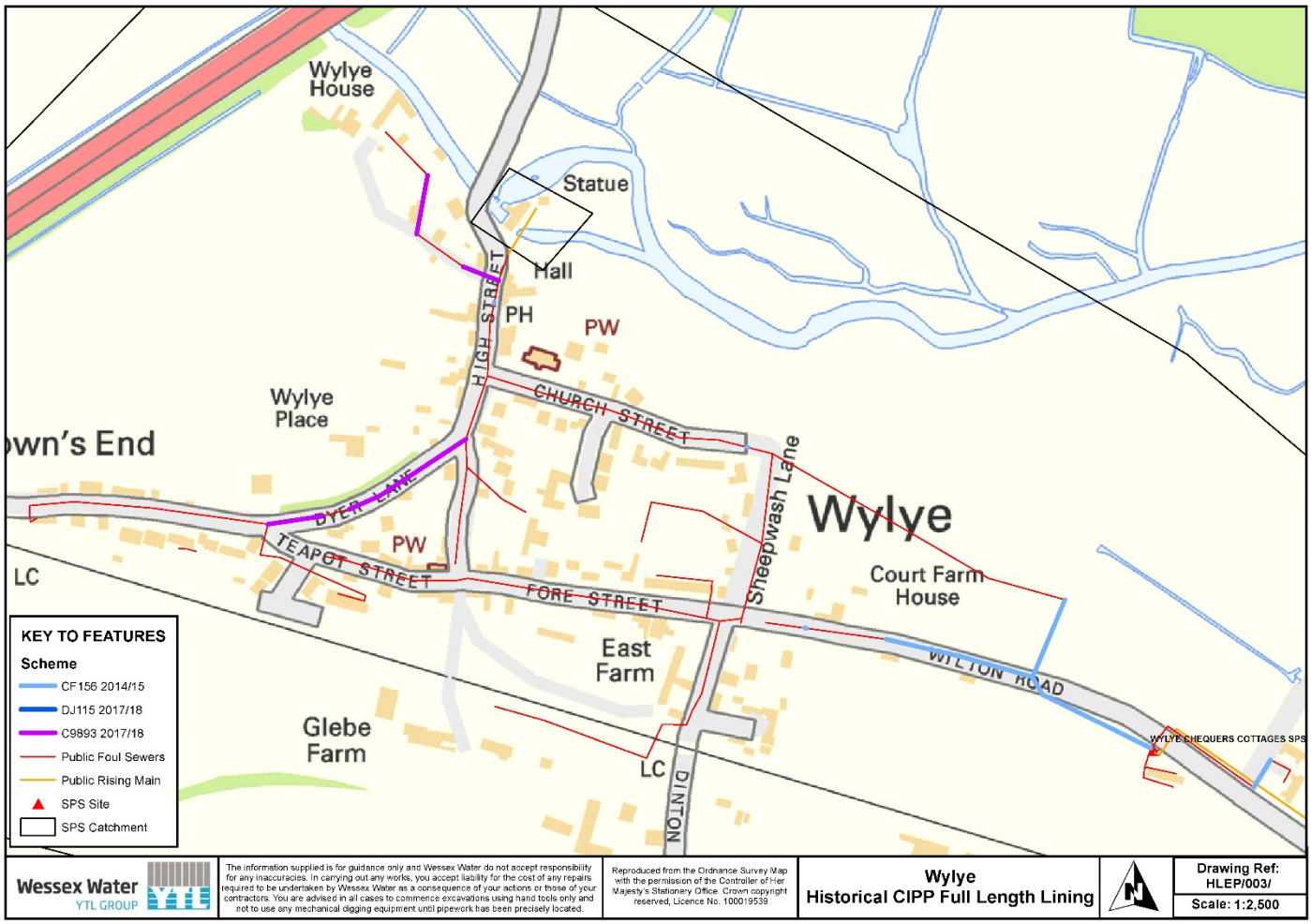
Financial Year	Infiltration Reduction Activity	CCTV - m	Sealing project	Sealing - m
2014/15	CCTV survey in Wylye and sealing of 7 lengths of sewer in Wylye	1,014	CF156	324
2015/16	CCTV surveys in Wylye and Hanging Langford	2,120		
2016/17	Small CCTV survey in Hanging Langford	500		
2017/18	Sealing and post lining CCTV of 5 lengths of sewer in Wylye (C9893), 8 lengths in Hanging Langford (DJ115)	564	C9893, DJ115	560
2018/19	Small CCTV survey in Wylye	632		

2019/20	Small CCTV surveys in Wylye and Hanging Langford	1,500		
2020/21	CCTV surveys in Wylye and Hanging Langford	6,446		
2021/22	CCTV in Hanging Langford, sewer sealing in Wylye and Hanging Langford	768	DP0132	499*
Total		13,544		1,383

Table 8. Summary of infiltration reduction activity for the Wylye and Hanging Langford catchments. *The most recent sewer relining works (DP0132) are still in progress, with 499m completed before March 31st 2022.

Sealing efforts in Wylye have yielded the best results with Chequers Cottage SPS now typically keeping pace with inflows for much of the winter. Infiltration has been observed in Hanging Langford during most CCTV surveys, however the volume of groundwater received at the pumping station has been higher than identified during survey work. The pumping station and surrounding lengths in Hanging Langford also remain surcharged for much of the year, hampering efforts to survey them. A water recycler in combination with multiple tankers was recently used to draw down the water level in these sewers, allowing for a successful camera survey despite the challenging conditions.

The survey found a pipe defect with a significant volume of clear water entering the sewer network. The length in question is adjacent to the River Wylye and lies at a depth which is below the water level in the river. The groundwater conditions make relining this length extremely difficult, and it must be done in the summer or autumn, when the groundwater table is lowest, to give our Sewer Renovations team the best chance of success. The work is planned for delivery as soon as possible.



Plan 3. Sewers in Wylye sealed since 2015 using cured in place pipe (CIPP) lining.

Plan 4. Sewers in Hanging Langford sealed since 2015 using cured in place pipe (CIPP) lining. DP0132 not shown.

7.4 Maintenance Activity

The following table is a summary of sewerage asset maintenance for Wylye and Hanging Langford since the IRP was first produced (excluding day to day activities like restarting blocked pumps):

Financial Year	Sewerage Asset Maintenance Activity
2014/15	Chequers Cottage SPS pumps replaced 20th June 2014, NRVs replaced 13th August 2014. Hanging Langford Pump 2 replaced 24th June 2014.
2019/20	Jetting round 7002168 in Hanging Langford cleaned 13th April 2019
2020/21	Chequers Cottage SPS new pumps installed 22nd September 2020. Hanging Langford SPS 2 new NRVs fitted 5th October 2020. Jetting round 7002447 in Wylye cleaned 23rd March 2021.
2021/22	Chequers Cottage SPS surveyed 11th February 2022. Hanging Langford SPS Pump 1 NRV replaced 20th September 2021, wet well cleaned 7th November 2021 & January 10th 2022, site inspection 18th March 2022.

Table 9. Summary of asset maintenance activity in Wylye and Hanging Langford catchments

At present no lengths of sewer are routinely jetted, but cleaning is carried out on an ad hoc basis when necessary. Pumps are inspected regularly by our Operations Teams, with work carried out as required.