Groundwater Impacted System Management Plan

East Shefford, River Lambourn

December 2020

Thames Water

It's everyone's water

Version control

Version	Date	Amendment	Author	Checked	Reviewed
1-d1	Nov 2020	Draft for EA	NW and AJ	DJ	APH
1-d2	Jan 2021	Final Draft for EA	DJ	APH	JW
1-V1	Jan 2021	Version 1	DJ	APH	JW
1-V2	July 2021	Update to introductory text and infiltration potential figures	DJ	APH	JW
1-V3	July 2021	Update to infiltration potential figures	DJ	APH	JW
Annual Update 2021	October 2021	Addition of the Annual Update 2021	DJ	APH	JW
Annual Update 2022	October 2022	Addition of Annual Update 2022	MB/JH	DJ	DJ
Annual Update 2023	October 2023	Addition of Annual Update 2023	MB	DJ	DJ
1-V4	January 2024	Addition of ATAC unit details	DJ	APH	JW
Annual Update 2024	October 2024	Addition of the Annual Update 2024	MW/CW	DJ	DJ

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Introduction

This document sets out Thames Water's approach to the management of groundwater infiltration in sewerage systems where the influence of groundwater infiltration is viewed as being significant and likely to lead the sewerage system, on occasions, becoming over-whelmed

All sewerage systems combined and separate will experience some groundwater infiltration[1] and a nominal allowance in design will be made for this. However, in some catchments the impact of groundwater infiltration can be considerable leading to impacts on service during periods of high groundwater, typically during the winter.

Groundwater can enter the sewerage system through the pipes and manholes, this may occur at a defect (crack, hole, displaced joint) or on a normal joint on the sewer or in the manhole. A key point to note is that where infiltration occurs it is not necessarily an indicator that the sewer is in poor structural state simply that jointing techniques used are not completely watertight.

Ingress of groundwater is not limited to the public system that Thames Water owns and maintains but potentially the private drains, manholes and sewers that connect to our system.

Preventing and reducing the impact of groundwater infiltration is predominately achieved through the lining of sewers and sealing of manholes. This entails the application of a synthetic liner within the pipe that creates a contiguous membrane for the length of the pipe or possibly section if the source of ingress can be narrowed down. For manholes it will typically entail sealing in a similar manner.

To line all sewers and manholes within most catchments would be prohibitively expensive to do so. Our approach to date has been centred on a 'find and fix' basis which has involved monitoring and investigating the networks in periods of high groundwater to identify sources of ingress and fix as we find them. This approach is constrained for the reason that investigations are typically limited to periods of high groundwater and when high groundwater occurs there are limited windows of time in which investigations can be successfully undertaken before flows either subside or the system is fully surcharged meaning CCTV surveys are not possible[2]. Once sections of sewers have been lined, it will be a case of waiting until high groundwater levels reoccur to assess the effectiveness of the work undertaken, which may not be the subsequent winter but several years later.

It is recognised that the 'find & fix' approach to date lacks a degree of certainty of resolution and for this reason Thames Water has in 2020 undertook a different approach for the medium to long-term management of groundwater, which is covered within this

[1] Sewers for Adoption makes an allowance for 10% of peak wastewater flow to allow for unaccounted flows such as groundwater infiltration.

[2] On occasions it is possible to over-pump between manholes to isolate sections of sewer to survey, this is not always feasible when the flows involved are simply too great to over-pump or the location prohibits this approach.

document under the plan section. These plans require significant investment which Thames Water will seek to secure through the price review process as service enhancement. In the meantime, we will continue to investigate sources of infiltration when it occurs and where feasible, undertake the work through our capital maintenance budgets. We refer to these as 'quick win' opportunities i.e. where we have high degree of certainty of reducing point sources of infiltration and can do so with reasonable costs and time.

The structure of this document has been created with input from the Environment Agency and structured around the Environment Agency's Regulatory Position Statement (RPS) for 'Discharges made from Groundwater Surcharged Sewers' (Dated: December 2016). Sections covered in this document include our 'Outline Plan' with timescales, locations of anticipated 'Unavoidable discharges', Mitigation i.e. how we intend to manage the risk until our plan is fully implemented and when we will publish future updates on progress against this plan. If we need to make an unavoidable discharge we will provide an authorisation document to the Environment Agency seeking their approval for any temporary discharge of groundwater surcharged sewers.'

Brief description of East Shefford catchment

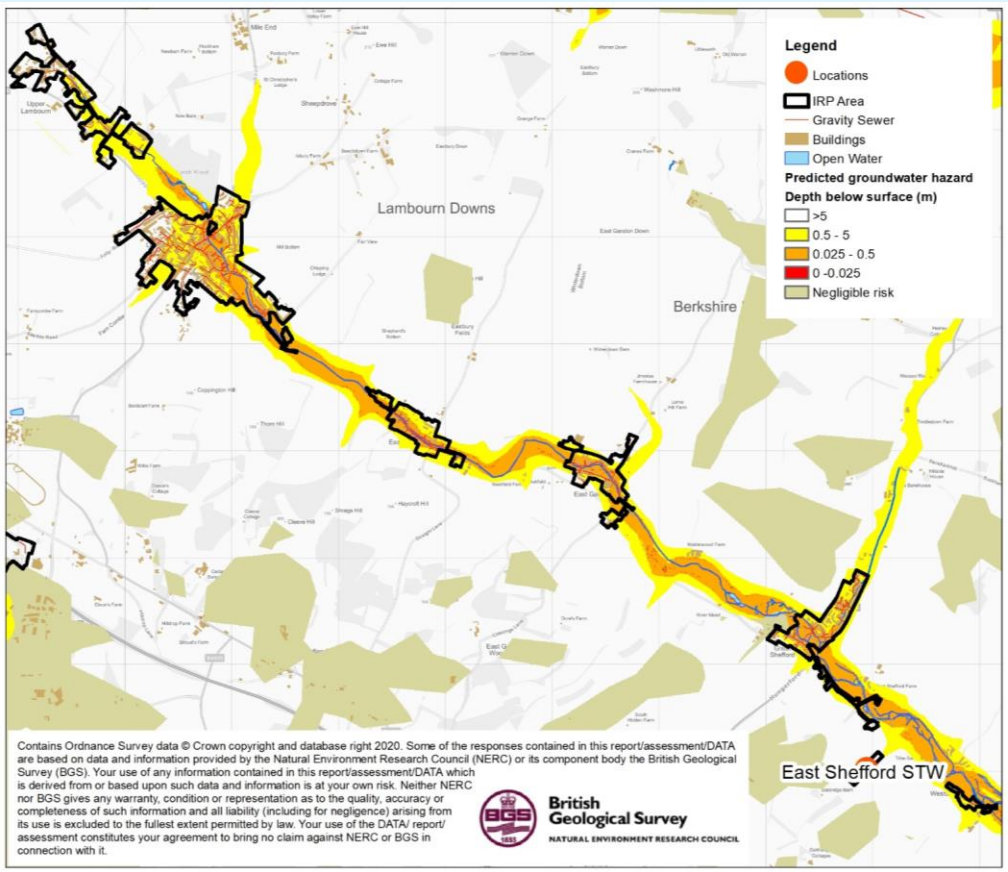


Figure 1.0 – East Shefford catchment

East Shefford is located in Berkshire. The East Shefford sewer network serves a population equivalent[3] of 6,020 within the settlements of Lambourn, Great Shefford, East Shefford, Eastbury and East Garston with a predominantly separate sewerage network totalling some 30km in length excluding private drains and sewers. The extent of the catchment is shown in Figure 1.0 above.

Problem characterisation

Groundwater has the potential to enter our sewers when levels are high which reduces their capacity and increases their risk of flooding. There is a strong link between the rising groundwater levels across the East Shefford area within the underlying chalk aquifer and the drainage issues some of our customers have experienced.

[3] Population equivalent or unit per capita loading, (PE), in waste-water treatment is the number expressing the ratio of the sum of the pollution load produced during 24 hours by industrial facilities and services to the individual pollution load in household sewage produced by one person in the same time.

Asset surveys found defects in some of the sewer pipes and manhole covers around the East Shefford area, which could allow unwanted flows to enter our sewer network. To aid with the problem, 8500m of sewers have already been lined and 83 manholes sealed.

In recent winters, the problems associated with groundwater infiltration have been associated with flooding incidences. Analysis has been conducted to identify thresholds in local groundwater monitoring boreholes above which incidents with groundwater infiltration become more likely.

Thames Water is responsible for the collection and treatment of commercial and domestic sewage. Typically, this will be the foul sewerage. Domestic or commercial roof and paved drainage will often go to a soakaway or directly to a water course/river, which if so is not the responsibility of Thames Water.

The Flood and Water Management Act 2010 places a responsibility on Lead Local Flood Authorities (LLFAs), to manage flood risk from surface and groundwater, plus a duty on all Risk Management Authorities (RMAs), to cooperate regarding flood risk. In our role as an RMA, Thames Water will work with West Berkshire Council as the lead local flood authority and as the planning authority, and the Environment Agency to ensure that a collaborative approach can be developed to address the problems.

Thames Water also has a statutory obligation to comply with environmental legislation. The Water Framework Directive establishes a strategic approach to managing the water environment, which the Environment Agency achieves through River Basin Management Plans and setting environmental objectives for groundwater and surface water. The environment is also protected from adverse effects of discharges of urban wastewater through the Urban Wastewater Treatment Directive, which requires us to improve and extend the sewerage system according to section 94 of the Water Industry Act (1991).

Within the upstream network, and villages of Upper Lambourn, Lambourn, Eastbury and East Garston, localised parts of the network have been impacted by excessive ingress of groundwater, leading to surcharge of manholes such as has occurred in Newbury Street.

Anticipated unavoidable discharges

Surcharges from groundwater infiltration currently affect Newbury Street, outside the Fire Station and Oxford Street with, in the most extreme situations, the sewer escapes entering the River Lambourn via Roadside Gullies (RSGs).

The works identified within this plan should reduce groundwater infiltration and the risk of sewage escapes. However, in the short to medium term these unavoidable discharges may continue to occur in times of high groundwater levels.

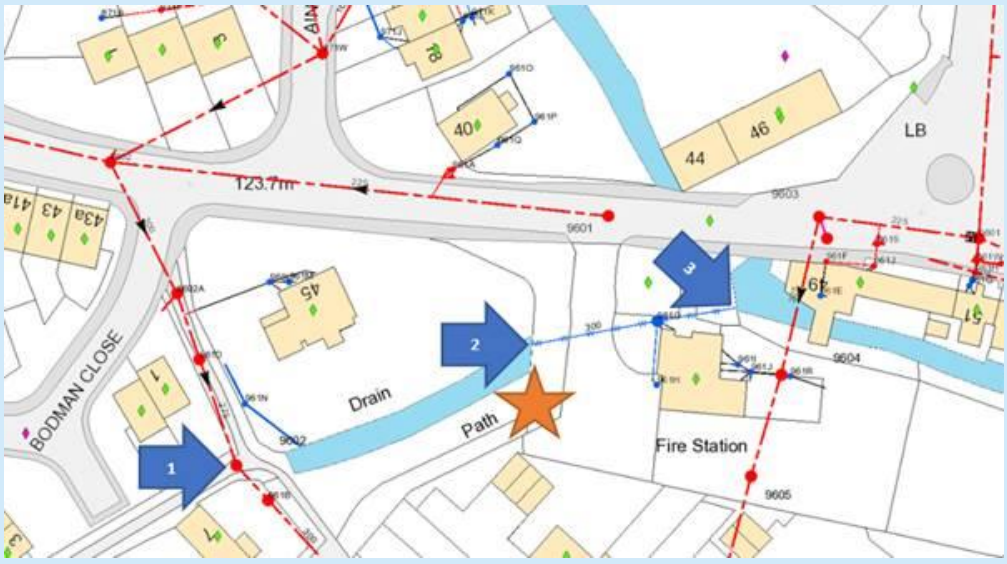
The strategy to mitigate the risk of infrequent sewage escapes to the local river from the impact of groundwater involves the deployment of an ATAC Biofilter at the affected location. In 2019/20 an ATAC was deployed in Newbury Street near Bockhampton SPS, however, in order to avoid the disruption associated with closing the road, future

ATAC deployment is proposed instead in the neighbouring footpath (see table below for further details). This would ensure the majority of the groundwater impacted sewage still remains in the sewerage system with a reduction in the overall stresses, namely in Oxford Street, and lowering the risk of sewage escapes due to the increased flow rates as a result of groundwater. It is anticipated that with the over-pump set up between successive manholes assisting with flows into Bockhampton SPS, re-deployment of an additional tanker to the SPS following deployment of the ATAC bio-filter, and the assistance of surface water flows in Upper Lambourn to safeguard the sewer network, the discharge from Newbury Street would be minimised and reduced in volume.

In 2023/24, an additional ATAC Biofilter was deployed near East Garston SPS. This is to ensure a reduction in the pressures on the system at other points, namely Mabberley's Yard, and prevent the manhole surcharging here due to the increased flow rates. This is to also ensure local residents can use their wastewater facilities without experiencing restricted toilet use and reduce the risk of internal and external flooding to properties.

Anticipated unavoidable discharges

Location	Nr. Newbury Street, Lambourn (see star in Figure below). Flow will be drawn from the manhole located at point 1 and, after treatment (through an ATAC unit), discharged into the surface water culvert (point 2) which enters the main watercourse at point 3.



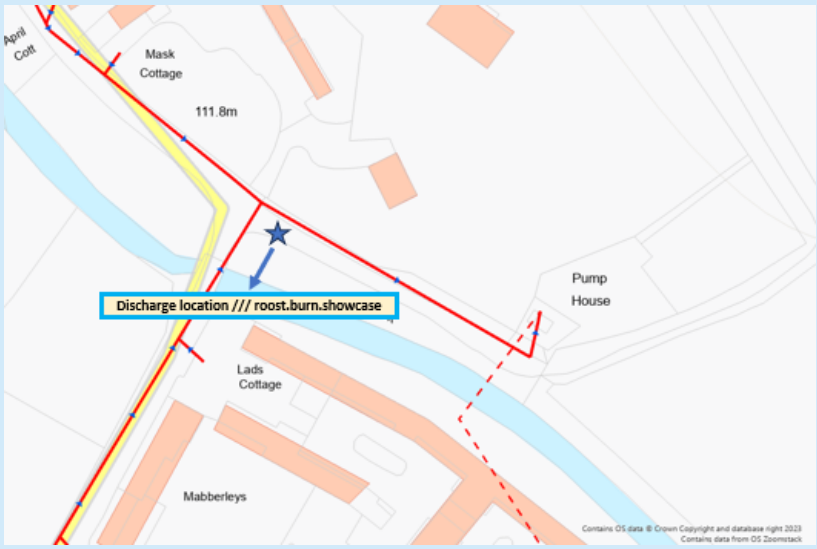
Anticipated unavoidable discharges

Discharges	10-20l/s
Likely Periods	When sewer surcharge places properties at risk of internal flooding or pollution risk and tankers are not a viable options due to flow volume, accessibility and level of disruption. The Trigger Level for engaging the proposed temporary discharge is 131.0m AOD. This level was established through a survey of historical river and groundwater levels, cross referenced against flooding events and will be reviewed yearly. Groundwater levels are monitored against these trigger levels in our system to ensure we can be prepared and deploy and prime the ATAC units in good time.
Mitigation	In order to ensure the current system is working to maximum capability the following actions will be carried out: • Regular sewer investigations (and resultant sewer cleaning) to remove any blockages. • Ensuring that Bockhampton SPS (downstream) is working to full capability and flows are passed forward effectively. • Ongoing investigations and remediation of priority infiltration sources as outlined in this document. • Identifying and taking actions to minimise where surface water ponding may be inundating manholes. • Tankering where appropriate in other areas of the system. In order to minimise the impact on the watercourse the discharges will be treated via an ATAC Biofilter which removes solids and biological loading from wastewater influents, whilst also adding dissolved oxygen into the effluent flow. It is anticipated that maximising flows through Bockhampton SPS and re-deployment of an additional tanker to the SPS following deployment of the ATAC bio-filter, the discharge from Newbury Street into the River Lambourn would be minimised and reduced in volume. Should flows stay within the sewer, and not reach the volume to discharge from the sewer, no discharge to the River Lambourn will take place.
Monitoring	During periods of discharge, water in the Lambourn will be monitored upstream and downstream to assess impact on the river amenity, use and quality. The following parameters at a minimum will be tested daily: - Biological Oxygen Demand - ammonia, - Phosphorus

	- solids - and bacterial quality including E. Coli
Contact	If discharges occur the Environment Agency will be informed (by logging through the Agency's National Incident Communication Service). For any other reporting please use the Environment Agency pollution reporting number 0800 807060. In addition, local community representatives will be informed. If the ATACs are deployed, signage will be placed in the locality and local letter drops carried out to inform residents. An example of the type of signage and information displayed is shown in the appendix of this document.

Anticipated unavoidable discharges

Location	We will discharge into the River Lambourn from the bank. Flows will enter the watercourse, after treatment through an ATAC unit, at location W3W /// roost.burn.showcase (436692, 176475).



Anticipated unavoidable discharges

Discharges	10-20l/s
Likely Periods	The Trigger Level for engaging the proposed temporary discharge is 131.0m AOD. This level was established through a survey of historical river and groundwater levels, cross referenced against flooding events and has been incorporated within the East Shefford Drainage Strategy, which East Garston and Eastbury is part of.
Mitigation	In order to ensure the current system is working to maximum capability the following actions will be carried out: • Regular sewer investigations (and resultant sewer cleaning) to remove any blockages. • Ongoing investigations and remediation of priority infiltration sources as outlined in this document. • Identifying and taking actions to minimise where surface water ponding may be inundating manholes. • Tankering where appropriate in other areas of the system. Future lining and sealing works may reduce the volume of water in the network. Should flows stay within the sewer, and not reach the volume to discharge using the ATAC, no discharge to the River Lambourn will take place.
Monitoring	During periods of discharge, flow in the Lambourn will be monitored upstream and downstream to assess impact on the river amenity, use and quality. The following parameters at a minimum will be tested every other day: - Biological Oxygen Demand, - Ammonia, - E. Coli

Anticipated unavoidable discharges

Contact	If discharges occur the Environment Agency will be informed (by logging through the Agency's National Incident Communication Service). For any other reporting please use the Environment Agency pollution reporting number 0800 807060. In addition, local community representatives will be informed. If the ATACs are deployed, signage will be placed in the locality and local letter drops carried out to inform residents. An example of the type of signage and information displayed is shown in the appendix of this document.

General outline plan & timescale

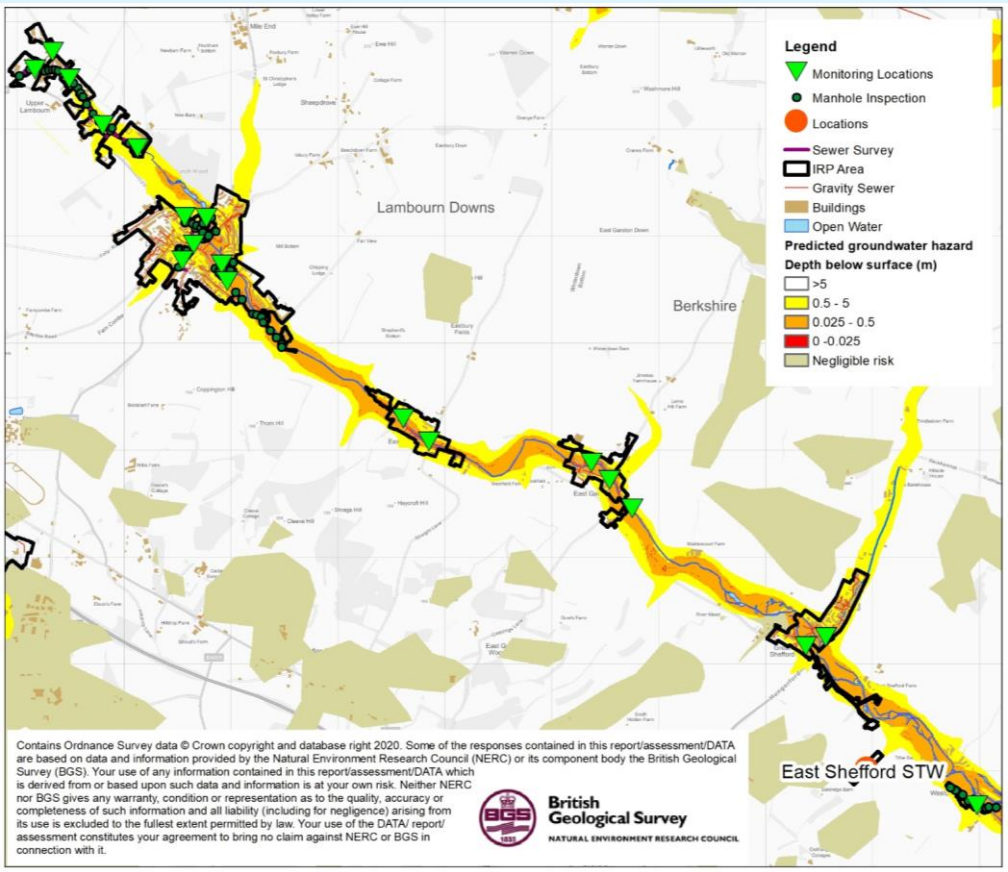


Figure 2.0 – East Shefford monitoring and infiltration zones

Key to bringing the impact of groundwater infiltration under control will be an enhanced monitoring regime. We have identified and have installed several telemetered depth monitor locations around the East Shefford system – see Figure 2.0.

Complimenting the flow [at the treatment works] and depth measurement [in the sewer network] we will use pumping station run time data, rainfall data, river level data, and groundwater level data to create a full picture of movement and source of flows around the catchment.

Zones of Groundwater Risk

We engaged with JBA Consulting to develop plans for East Shefford that identify zones of groundwater risk, see Figure 2.0. These zones are modelled areas where the groundwater has been determined to be above the sewer and hence pose a potential risk for groundwater ingress.

The sewer depth monitors referred to earlier have been sited in and around these zones to verify and calibrate the risk in each of the zones.

If following the proposal to the sealing in part or wholly[4] of the high risk zones, should it be required, the system is found to be still experiencing excessive infiltration we would then look to potentially seal 'private' laterals and/or drains along with starting to seal the medium to low risk zones.

This document sets out an unconstrained approach to resolving the impact of groundwater infiltration within the system. Investment to address infiltration will be assessed and prioritised against other drivers e.g. STW upgrades, both in the catchment and across the region at each price review.

With this plan we remain committed to minimising the impact of groundwater on the sewerage system in East Shefford.

In addition to the sewer lining (8,500m) and manhole sealing (83 No.) completed in East Shefford to date as outlined in our previous Drainage Strategy, our general medium to long term plan is to apply a hierarchy to sealing the sewer as follows:

Activity	When	Description
Model Zones	2020/21	JBA have been engaged to undertake modelling activities to identify the areas to be targeted for sealing in the 56 systems identified as being impacted by infiltration.
Install monitors	2020/21	Monitors installed to calibrate and validate the zones. Each year completeness / coverage monitors will be reviewed and added to / or modified, as necessary.
Calibrate zones	Refined each year	Following each winter, we intend to review the data from the monitors and if necessary, redefine the zones.
Look & Lift	Each winter	The look & lift surveys have two purposes, firstly to compliment the monitoring and secondly to identify 'quick fixes' that we would address through our normal capital maintenance.
CCTV	2020-2023	Required to confirm sewer condition and provide information to assist with costing any sewer lining.

[4] Decision of extent of sealing will be based on outcomes of works undertaken to date, results of monitoring and successful submission of our plans for investment.

Activity	When	Description
Minor works	2020-2023	As mentioned, if we detect minor works being required, we would look to resolve these as and when we find them.
PR24	2023/24	Ideally through monitoring and on-going investigations work towards managing the infiltration risk, in AMP7, will be successful. However, in the absence of evidence justifying the need not to undertake sealing of the high-risk zone this is to be included as part of PR24 investment plan. This work will be subject to Cost Benefit Analysis and Best Technical Knowledge Not Entailing Excessive Cost (BTKNEEC) assessments.
High risk zone sealing	2025-30	Sealing of high-risk zone undertaken subject to need being demonstrated.

East Shefford Infiltration Management Plan

As detailed above the impact of Infiltration is experienced within the sewerage network with infrequent sewage escapes.

Our approach to the resolution of infiltration impacting the East Shefford sewerage system is outlined below.

High level approach statement

For East Shefford our approach to tackling infiltration will be undertaken as follows:

1. To deal with the infiltration experienced we will investigate the network with a view to identifying sources of ingress of infiltration that are cost effective[5] to address. To investigate the network, we/will:

- Have undertaken a desktop analysis to determine infiltration high to low risk zones (October 2020);
- Installed additional monitoring to back up the analysis (a) and to aide focusing of locations for identification of infiltration (2020 to 2023). Each year we will assess the completeness of monitoring and if required add to or modify the current locations.
- Undertake sample CCTV in the high to low risk zones to assess the general asset health of the sewers and manholes (ongoing).
- Review results of Winter 2019/20 and 2020/21 with historic data to build up evidence to support interventions in the network (Summer 2021).

2. Where interventions can be undertaken as part of normal sewer maintenance activities these will be communicated and progressed.

3. If significant investment is identified as being required, then this will need to be considered in terms of relative need compared to other systems being investigated for infiltration reduction and need. However, where viable opportunities are identified these will be included in our future AMP9 (2030-2035) programme of investment. Significant investment needs may need to be included in future investment cycles.

Investigations

As mentioned above we have commissioned JBA consulting to undertake an exercise involving groundwater elevation data to determine which areas of the network are potentially below the groundwater table during high groundwater periods.

Site investigations, undertaken by DeneTech and our Customer Field Services (Thames Water Operations) have included 'look & lift' surveys, CCTV and where necessary dye tracing to confirm connectivity.

[5] Assessment of cost effectiveness is based on assessment of the ratio of the cost of a solution to the monetised benefit gained from implementing the solution i.e. reduction in flood/pollution risk and/or reduced operating costs.

A table of the work undertaken is included in the appendix to this report.

Monitoring

Sewer Depth Monitors have now been installed in the catchment (see Figure 2.0). These devices are telemetered and provide real time data on the level of flow in the sewer.

The purpose of these units is to act as alerts for high groundwater impact in the sewer, calibration of the zones of infiltration risk and to demonstrate benefit gained from work undertaken to reduce infiltration.

To provide evidence in the future of further need to manage the impact of infiltration.

Mitigation

On occasions to avoid flooding of properties or to manage the risk of damage to the environment we may undertake tankering from (manholes) points on the network, make use of pumps to manage flows or deploy settlement tanks to part treat sewage before release to the environment.

With regard to East Shefford we are considering the deployment of two ATAC units as detailed above. We would only look to deploy this mitigation either where all other approaches have ceased to be effective or where property flooding and / or pollution would be a likely risk had we not undertaken the mitigations.

Updates

Work on the Groundwater infiltration management plan will continue, and we will aim to provide updates annually by the end of October each year.

Appendix

Groundwater infiltration potential analysis

The sewer network has classified by the groundwater infiltration risk zones. The lengths of sewers within these zones is presented in the table below.

Sewer Length by Groundwater Infiltration Risk Zones

Risk category	Description	Length (km)	Percentage
High	Predicted groundwater extreme >1m above pipe invert	7.93	35.1
Medium	Predicted groundwater extreme 0-1m above pipe invert	3.66	16.2
Low	Predicted groundwater extreme 0-1m below pipe invert	3.92	17.4
Very Low	Predicted groundwater extreme >1m below pipe invert	7.08	31.3
Total		22.59[6]	100.0

In addition, the table below presents the surface water flood risk classification for manholes within the catchment.

Manholes by Surface Water Inundation Risk Category

Risk category	Description	Number	Percentage
High	Inundation risk in 3.3% AEP fluvial or pluvial event	181	19.8
Medium	Inundation risk in 1% AEP fluvial or pluvial event	48	5.3
Low	Inundation risk in 0.1% AEP fluvial or pluvial event	154	16.8
Very Low	All other manholes	531	58.1
Total		914	100.0

[6]Total of sewer length is for length of mapped sewers only and will not include unmapped S105a transferred sewers in all cases.

Investigations & remedial work undertaken since 2019/20 and future plans

The three tables below summarise the finding of the survey and implementation work identified in the 2019/20 period. The final table summarises our current known plans for remediating groundwater infiltration issues.

2019/20 Survey Statistics

Elements		Units	Value	Comment
Planned Survey		m	1,927	Survey was planned for a significant part of the valley floor. It was possible to complete 76% of the survey (see Figure 2)
Survey Completed		m	1,465	
		%	76	
		Lengths (No.)	94	
Clear Flow Observed		m	1,463	100% of the sewer network surveyed had evidence of groundwater infiltration
		%	100	
Sewer Infiltration Locations Identified	Infiltration Gushing	No.	4	69 groundwater infiltration locations were identified in the sewers. Of those 13 were identified as Priority 1 and therefore should be the focus of repair as soon as possible.
	Infiltration Gushing at Joint		9	
	Infiltration Running		9	
	Infiltration Running at joint		30	
	Infiltration Dripping		1	
	Infiltration Dripping at joint		6	
	Infiltration Seeping		2	
	Infiltration Seeping at joint		7	

Elements		Units	Value	Comment
Manhole Infiltration Locations Identified	Infiltration around pipe	No.	8	28 groundwater infiltration locations were identified at manhole locations. Of those 2 were identified as Priority 1 and therefore should be the focus of repair as soon as possible.
	Infiltration through benching		6	
	Infiltration through chamber wall		6	
	Gushing		2	
	Running		6	
	Dripping			
	Seeping			
	Grand Total		28	
Monitoring Locations Active		No.	19	
Details of other Surveys				

2019/20 Implementation Works

Activities	Value	Comment
Sewer Lining Length (m)	46	Sewer sealing carried out in Upper Lambourn (near Chestnut Cottage), Lambourn (Tubbs Farm Close and Foxbury area), Manhole sealing has been undertaken in the locations outlined above also and along Straight Lane in Eastbury.
Infiltration Points Targeted (no.)	13	
Manhole Sealing (no.)	19	

In addition to the above, the following works are approved and being planned in with our contractors imminently.

East Garston: 27m of leak tight liner, lining of 21m of public laterals and manhole sealing at 5 locations.

Future Works

These are subject to feasibility and contractor review as the classification of gushers and runners is still a relatively subjective analysis

	Priority 2020/2021	Known follow On Work
Survey	See main text	
Sewer Lining	11 Priority 1 locations identified	26 weeping locations identified in 2019/20 Locations identified in Future Surveys
Manhole Sealing – Infiltration Ingress	2 Priority 1 locations identified	7 weeping locations identified in 2019/20 Locations identified in Future Surveys
Manhole Sealing – Pluvial and Fluvial Ingress	Plan to be developed based on at risk manholes identified in JBA analysis	
Sewage Treatment Works Upgrade	Not Required	

Example information and signage

Your reference ~~number~~
BB973534

thameswater.co.uk

0800 316 9800
We're open 24/7

03 April 2020

Working in Aldbourne

This ATAC Eco filter is a mobile sewage filtering unit which will operate 24 hours a day.

How it works?

The Eco filter works using the same basic principles as our traditional Sewage Treatment Works. A pump will feed dirty water into the unit so it can be filtered. Any contaminants within the water are broken down and once water has passed through the Eco filter it can safely be returned to the environment.

Why is this needed?

The high groundwater levels experienced recently have caused extra water to enter our sewers and overwhelm them causing sewer flooding. This is one of the measures being put in place to address the issue and by installing this unit, we will improve the quality of the water which we are not able to prevent from escaping.

What does it look like?

Outside view:

Dirty water entering the filter unit to be treated and then pumped to the top of the unit

Treated water leaving the unit and returning to the environment

Page 1 of 2

Inside view:

Dirty water being pumped into the unit and working its way through the filter system.

Glossary of terms

AEP – Annual Exceedance Potential

AMP – Asset Management Plan

CCTV – Closed Circuit Television

EA - Environment Agency

IRP – Infiltration Reduction Plans

MH – Manhole

STW – Sewage Treatment Works

WINEP – Water Industry National Environment Programme

Addendum – Annual Update 2021

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Introduction

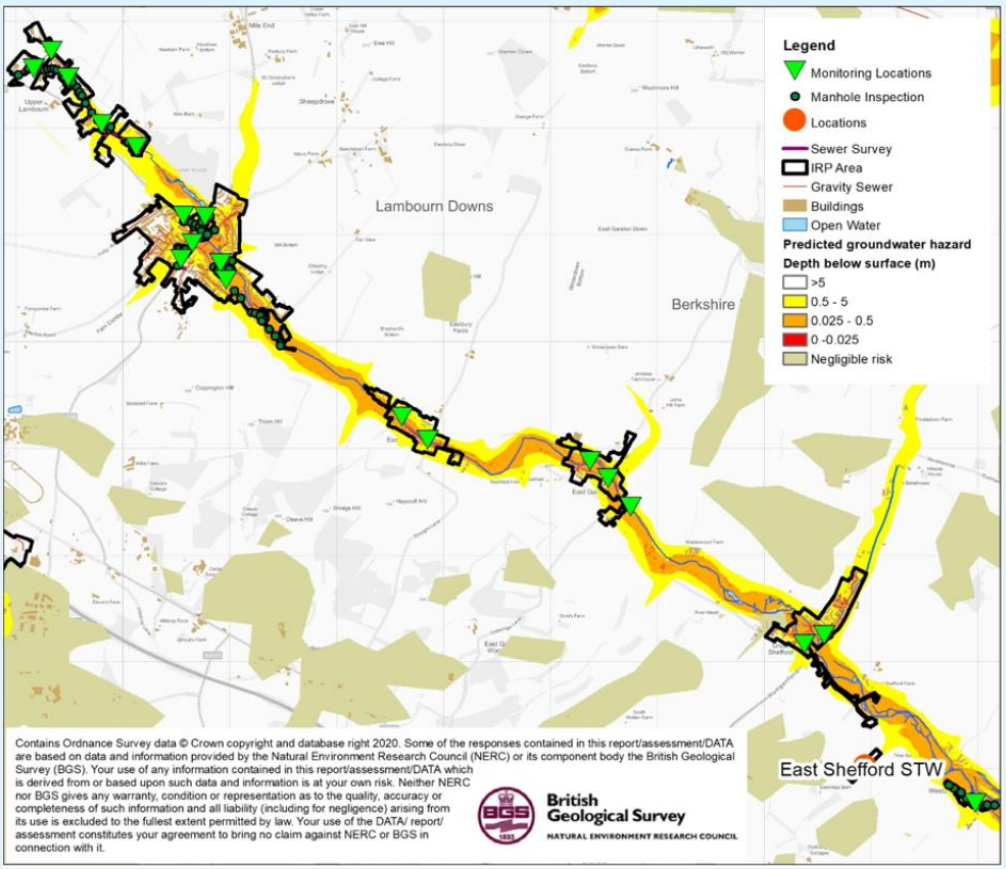

Figure 1 – East Shefford monitoring and infiltration zones

This addendum to the East Shefford Groundwater Impacted System Management Plan 2020 (GISMP) provides an update on performance/work undertaken in the period from September 2020 to September 2021 (the UK Hydrological Year [1]) key points covered include:

- Hydrological Conditions
- How the sewerage system has performed over this period
- Mitigation / remedial measures progressed over the last year and being planned.
- Summary and next steps

[7] Happy New Water Year! | National River Flow Archive (ceh.ac.uk)

2020-21 Hydrological Review

This section summaries the hydrological conditions at East Shefford over the period

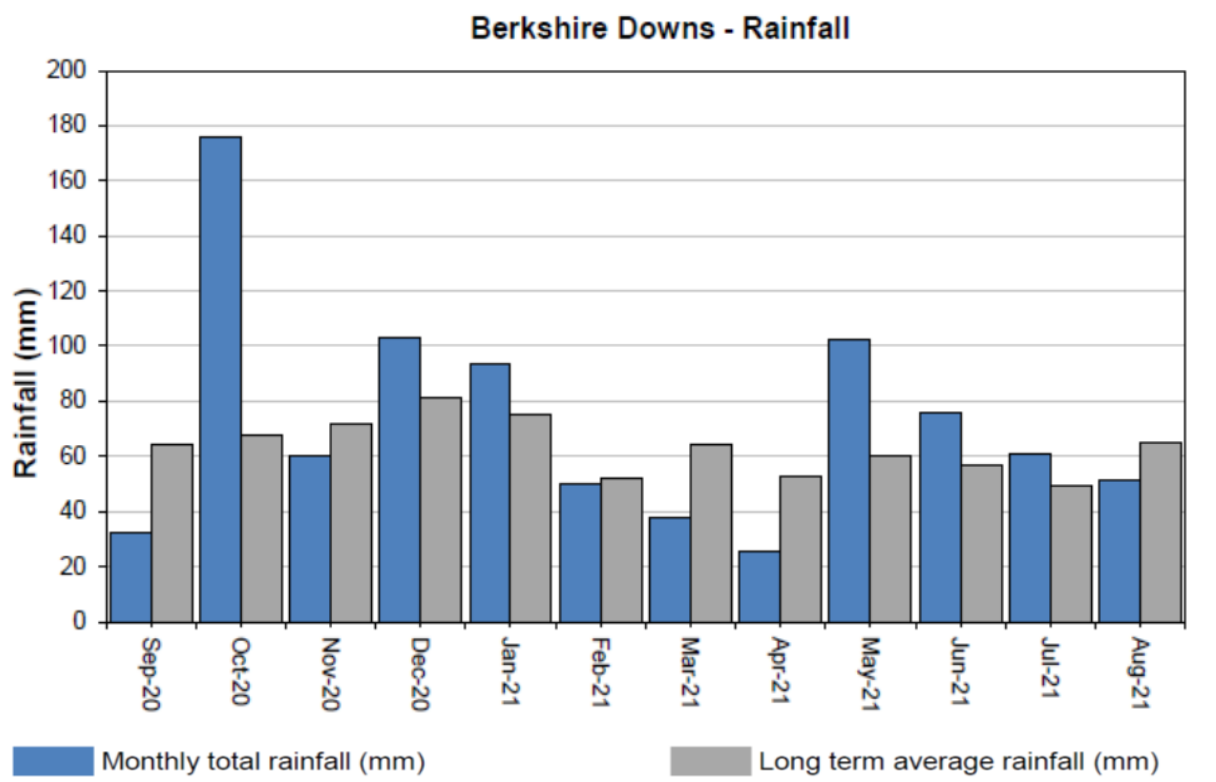

Figure 2 – Monthly rainfall depths local to the system

East Shefford is situated in the Berkshire Downs water resources area. Figure 2 shows the monthly rainfall depths against the Long-term average rainfall in the location of East Shefford over the period *taken from the Environment Agency Water Situation Report August 2021*[8]. The graph indicates that monthly rainfall at times in the last year has marginally exceeded long-term averages, with notable exceedance in October 2020 as a result of Storm Alex.

The Environment Agency has several observation boreholes measuring groundwater levels in the chalk in the area. From previous investigations we have identified that the Upper Lambourn and Longacre boreholes are good indicators of groundwater levels within the catchment. Figure 3 shows the location of the British Geological Survey (BGS) monitoring boreholes at Upper Lambourn and Longacre. Figure 4 and 5 present the last year and last ten years groundwater level.. They show that last winters groundwater level has been notably high, with the groundwater maximum close to or matching historic levels recorded in the winters of 2012/13 and 2013/14.

[8]*Environment Agency Water Situation Report August 2021* *https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1016481/Thames_Water_Situation_Report_August_2021.pdf*).

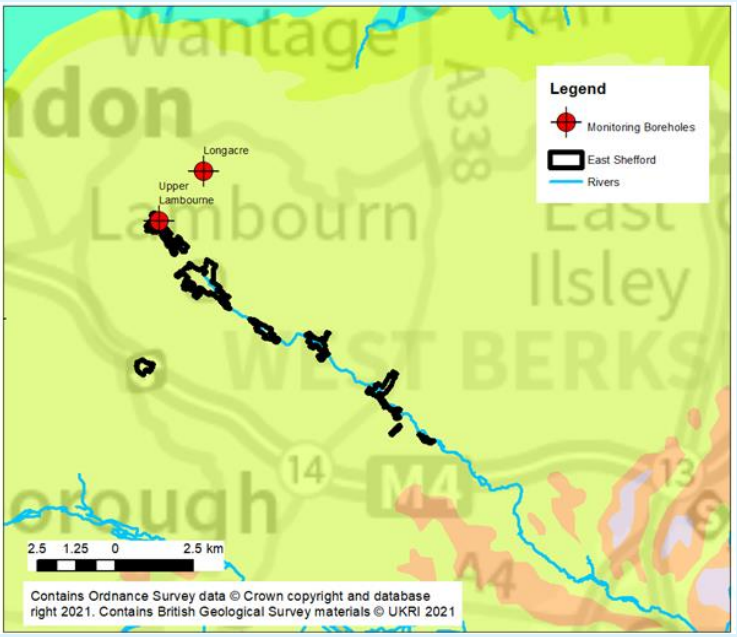

Figure 3 – Location of Upper Lambourn and Longacre Monitoring Boreholes Relative to East Shefford

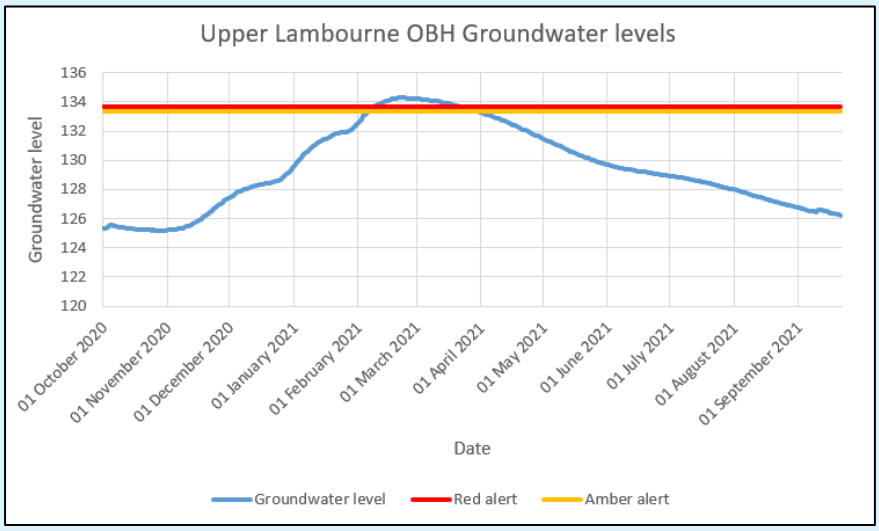

Figure 4 – 2020/21 Groundwater Levels at Upper Lambourne Observation Borehole (OBH)

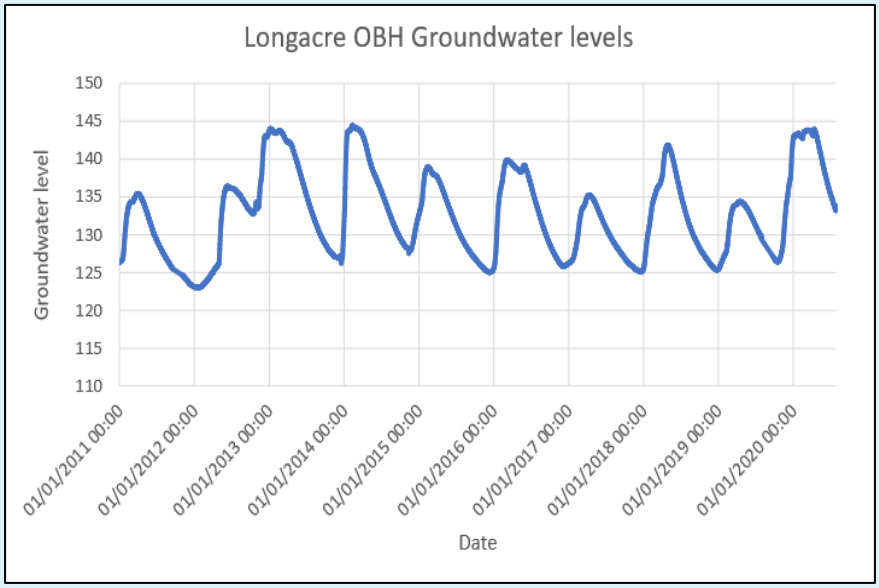

Figure 5 – 2011-2021 Groundwater Levels at Longacre Observation Borehole (OBH) (more complete data for this time period than Upper Lambourne OBH).

Investigations & remedial work undertaken in the period and future work

Lift and Look and CCTV surveys have been carried out by our local Operational teams in this system over the past winter. Further surveys will be continued over future winter periods where groundwater levels allow.

The two tables below summarise remediation work undertaken in the period

Remediation work in the period

Activities	Value	Comment
Sewer Lining Length (m)	144m of sewer lining has been carried out by our operational teams. A further 54m of lining is due to be complete before the end of 2021 which will remediate the 13 gushers as identified in our original GISMP report.	A further 1256m of sewer lining and sealing of 32 manholes has been approved . This work will commence this year by our operational teams but will not be complete until 2022 *(also noted in next table).* Remaining work subject to site conditions being suitable.
Manhole Sealing (no.)	1 manhole has been sealed by our operational teams, a further manhole is due to be sealed by the end of 2021.	

Future Works

Activities	Priority 2021/22	Known follow On Work
Survey	Further survey will be carried out as groundwater levels allow.	
Sewer Lining	1256m of sewer lining has been approved. Work will start in 2021 and be continued in 2022 as groundwater levels allow.	
Manhole Sealing – Infiltration Ingress	32 manholes have been approved. Work will start in 2021 and be continued in 2022 as groundwater levels allow.	
Manhole Sealing – Pluvial and Fluvial Ingress	Plan to be developed based on at risk manholes identified in JBA analysis.	
Sewage Treatment Works Upgrade	N/a	

2020-21 Infiltration Review

This section summaries the scale of infiltration at East Shefford in the period

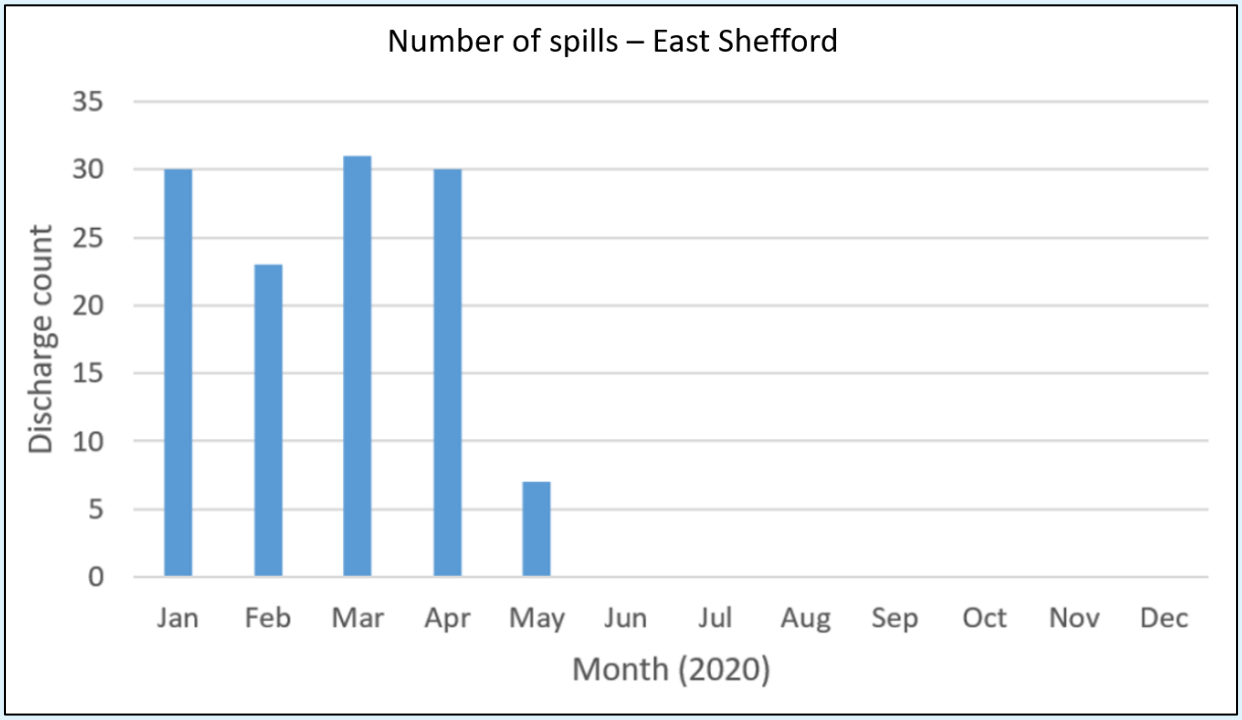

Figure 6 – Number of spills (discharge count) at East Shefford STW (taken from Event Duration Monitor (EDM) Data)*

Figure 6 shows that during the January to May 2020 period the Sewage Treatment Works (STW) experienced a number of discharges (spills). In the summer, no spills were recorded highlighting the influence of groundwater infiltration/winter flows on the system. This Combined Sewer Overflow location has met the trigger for the EA's Storm Outfall Overflow Assessment Framework (SOAF) and is currently under further investigation with regards to root cause and impact. Tankering was carried out in the East Shefford system over the Winter period to minimise the risk of property flooding. Tankers were unable to keep up with the flows experienced therefore an ATAC bio-filter was deployed in order to protect properties as outlined in the original GISMP report.

Anticipated unavoidable discharge	
Switch on date	15th February 2021 (deployed in place prior to this date, but not operated)
Switch off date	22nd March 2021
Sampling Data Summary	Regular sampling during this period showed a 10% drop in Dissolved Oxygen (DO) at the point of discharge and increased Ammonia levels from 0.6mg/l to 3.6 mg/l. Discolouration in the watercourse was noted on one sampling occasion and sewage fungus was observed at the point of outfall. No rag or solids were observed at any monitoring point. At no monitoring point were any fish seen alive, dead or in distress. This event was categorised as a CAT3 pollution.

*2020 verified and audited EDM data. 2021 calendar year data is awaiting verification before being published.

Summary

The winter of 2020-21 has been a particularly wet winter with groundwater levels in the aquifer beneath East Shefford notably high for long periods, as high as level seen in 2012/13 the previous highest observation. This was reflected in the number of storm discharges occurring at the Sewage Treatment works (Aldbourne), which is indicated by the Event Duration Monitoring (EDM) data. In additional, this Combined Sewer Overflow location has met the trigger for the EA's Storm Outfall Overflow Assessment Framework (SOAF) and is currently under further investigation with regards to root cause and impact.

Impacts of groundwater infiltration were also seen in the foul network where tankering was undertaken until no longer sustainable to protect against property flooding. An anticipated unavoidable discharge was made via a bio-filter (ATAC) unit as outlined in our original GISMP between the dates of 15th February 2021 and 22nd March 2021. This anticipated discharge was categorised as a CAT3 pollution.

Remedial measures continue to be implemented and further extensive lining and manhole sealing is planned over the next year.

Our operational teams have worked with local stakeholders to improve overland drainage in the area which may be contributing to inundation into the foul system through manholes.

Lift and look and CCTV surveys will continue throughout the remaining wet winter periods with the aim of finding further priority locations for remediation and investigating/justifying the need for future larger scale lining as part of our Price Review (PR) process if required.

Addendum – Annual Update 2022

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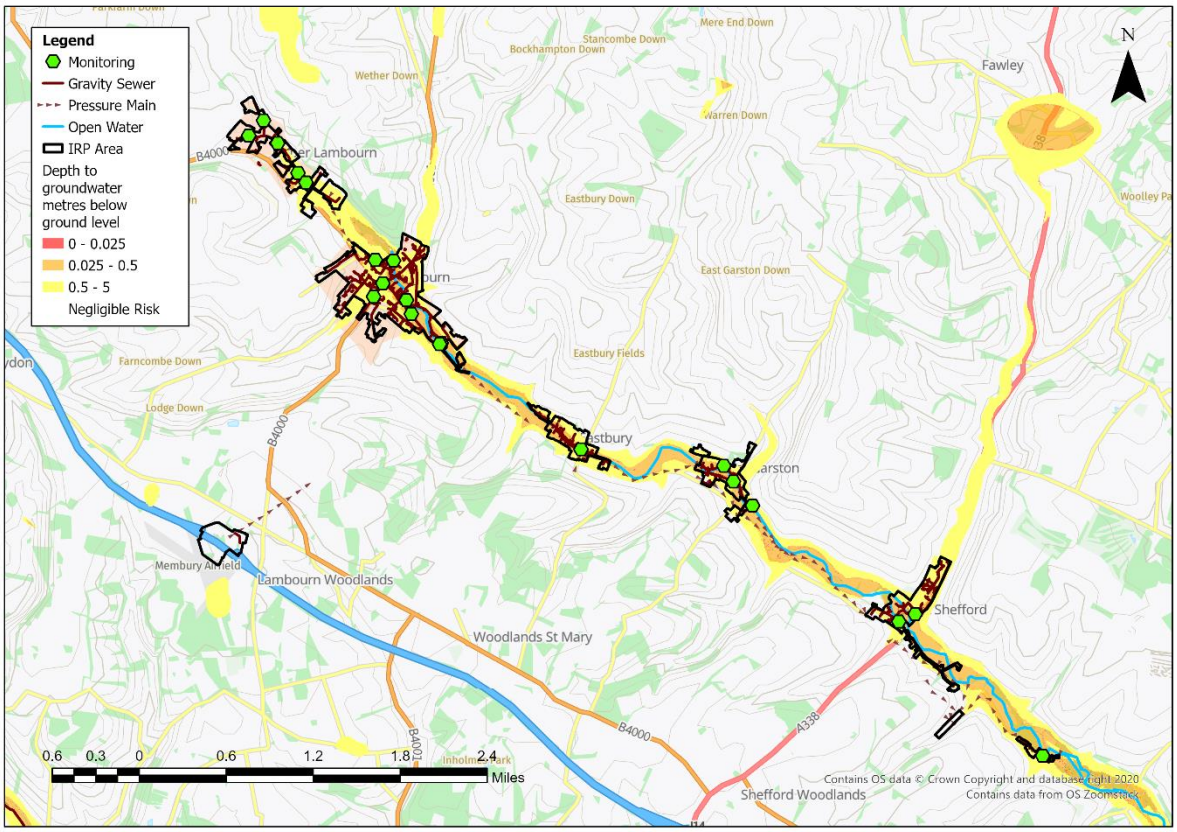
Overview

This addendum to the East Shefford Groundwater Impacted System Management Plan 2020 (GISMP) provides an update on performance/work undertaken in the Hydrological Year October 2021 to September 2022. The key points covered include:

- Hydrological conditions
- How the sewerage system has performed over this period
- Mitigation / remedial measures progressed over the last year and being planned
- Summary and plan for 2022/23

Figure 1 – East Shefford Monitoring Plan



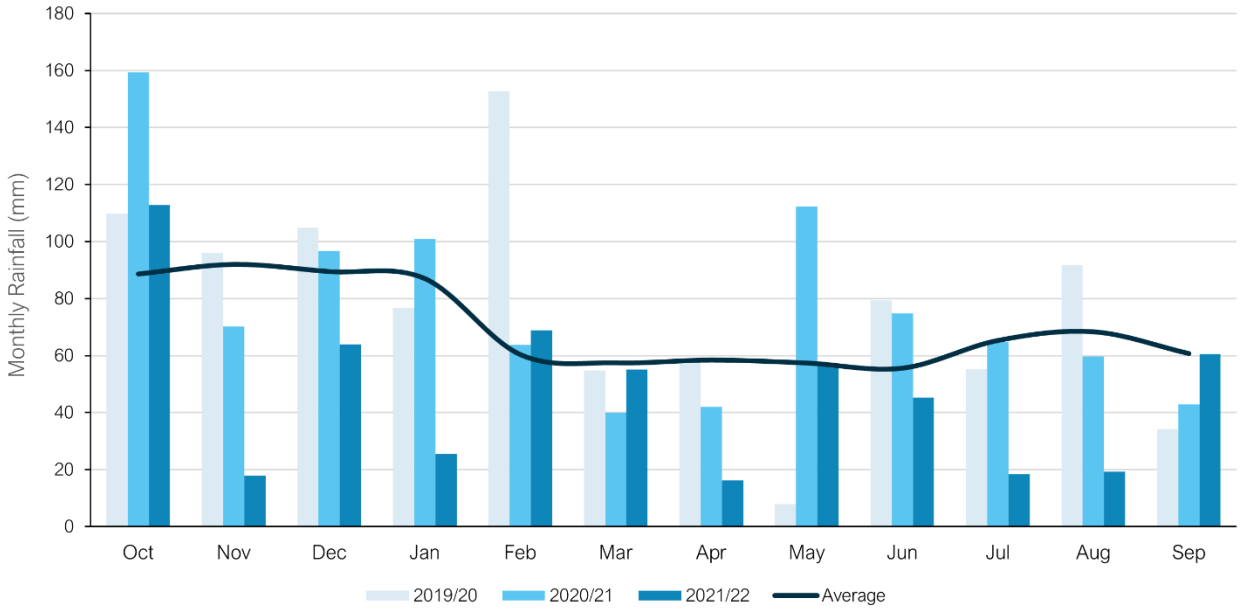
Hydrological Review – 2021-2022

This section summaries the hydrological conditions within the East Shefford catchment within the period under investigation and provides comparison against previous year's performance to put the annual performance into context. The hydrological review has been undertaken based on the Hydrological Year which runs October 1st to September 30th.

Catchment Rainfall

Representative Radar rainfall has been used to generate monthly data at catchment level for comparison with average data generated by local Met Office Weather Station Records. Figure 2 presents the comparison of this data for the last three hydrological years to support longer term trends within the local system.

Figure 2 – Monthly Rainfall Performance



Average Values taken from Met Office Weather Station at Marlborough based on the period 1991-2020

The total rainfall for the 2021/22 hydrological year is 32% below the annual average total. Total rainfall values are presented in Table 3 below.

Table 3 –Total Rainfall Based on Hydrological Year

Average (mm)	2019/20 (mm)	2020/21 (mm)	2021/22 (mm)
841	921	928	568

Groundwater / Local River Level

The East Shefford catchment is situated in the Berkshire Downs water resources area. It primarily sits in the New Pit Chalk Formation and Seaford Chalk Formation. These are generally comprised of carbonate material forming distinctive beds of chalk. The formations are dedicated principal aquifers within the UK.

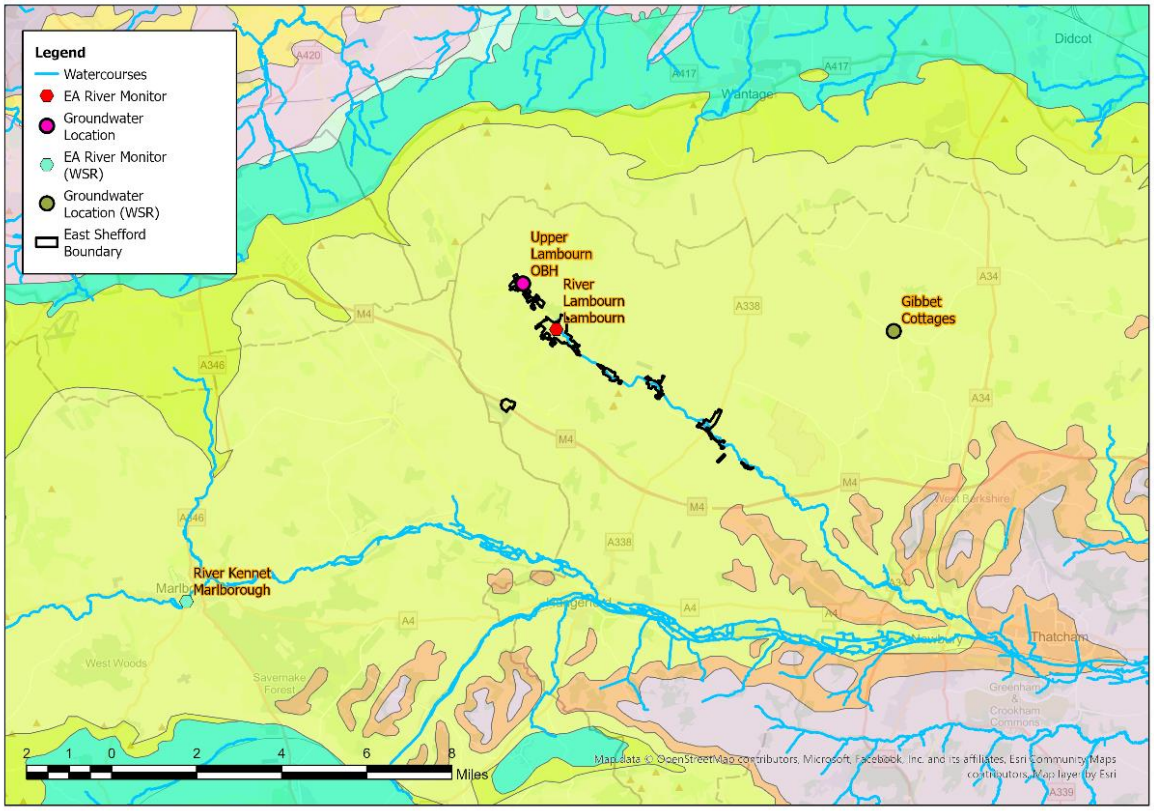
The Environment Agency has gauging stations on local watercourses measuring stage and observation boreholes measuring groundwater levels locally to the catchment which can be used to provide indicative local groundwater performance.

From previous investigations we have identified the following sites are good indicators of groundwater levels within the catchment.

- River Lambourn, Lambourn.
- Upper Lambourn OBH.

These sites are illustrated in Figure 4 below, alongside the closest groundwater reference station and closest gauging station from the Water Situation Report.

Figure 4 – Local Monitoring Stations



The following figure represents the last three hydrological years of level information at the indicator site to build a picture of the relative conditions prevalent in the current year. It is presented against both the daily total rainfall values for the catchment and a rolling 15 day total rainfall.

Figure 5A – River Lambourn at Lambourn

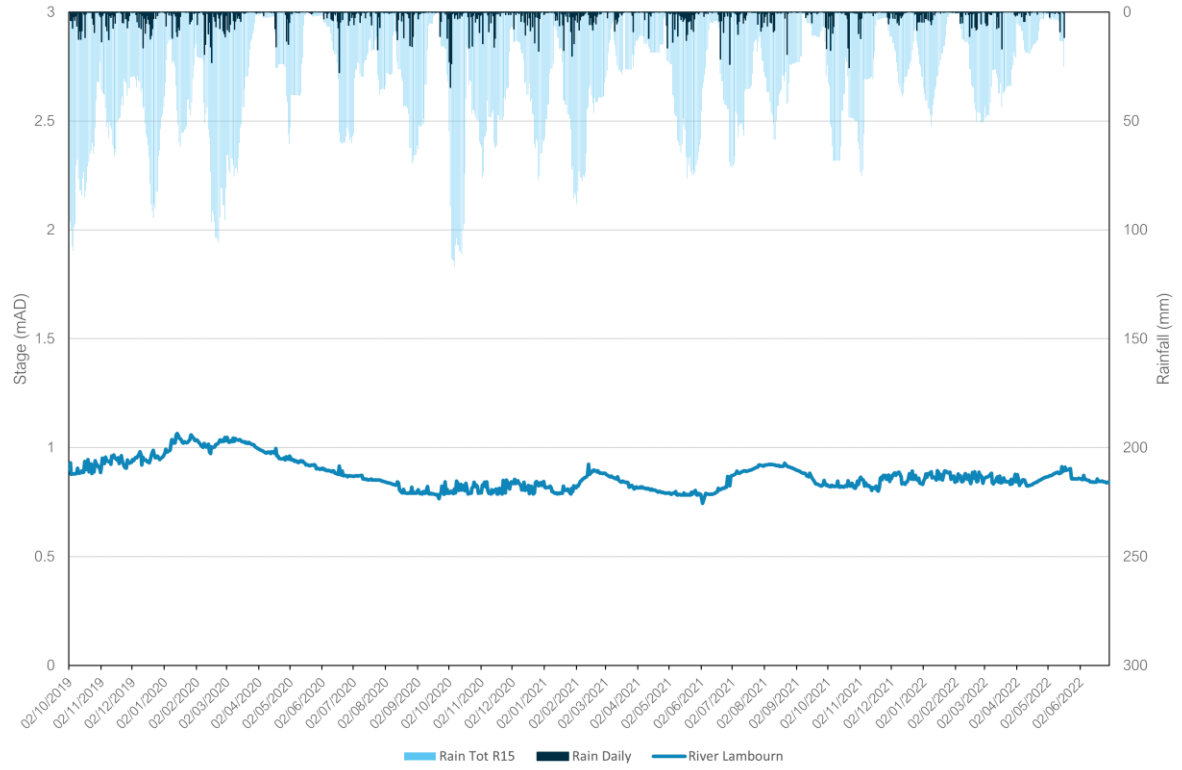
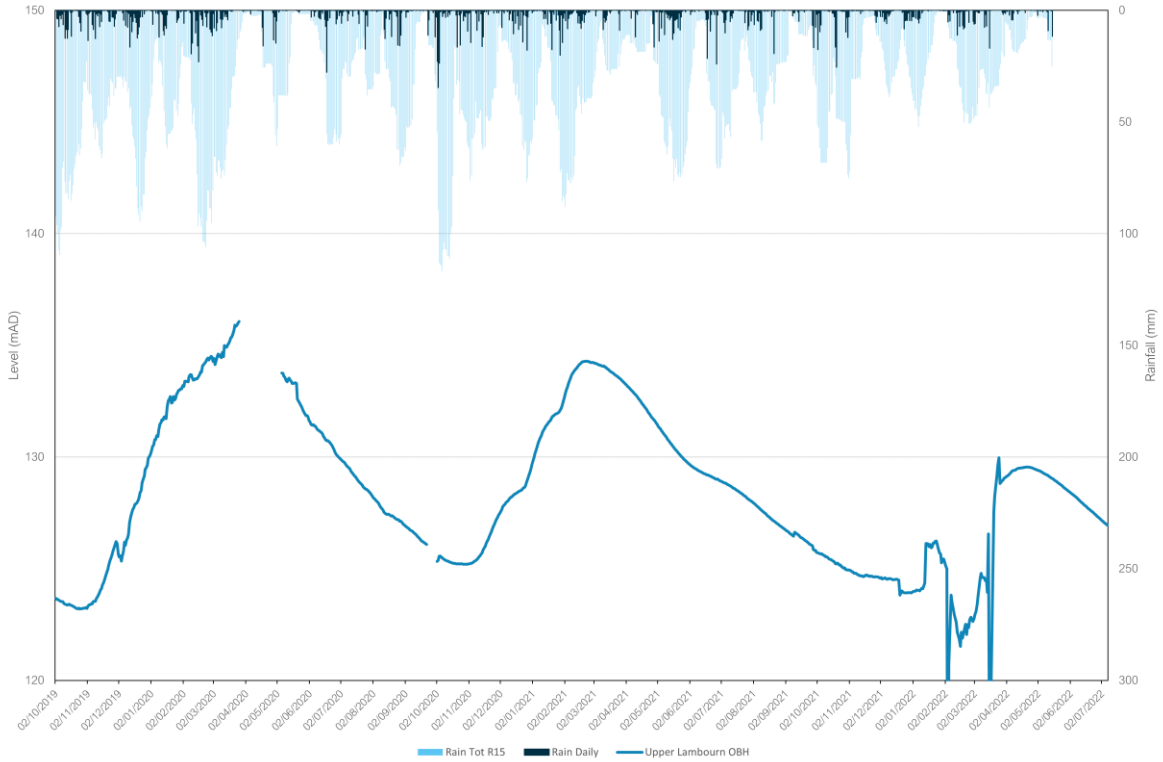
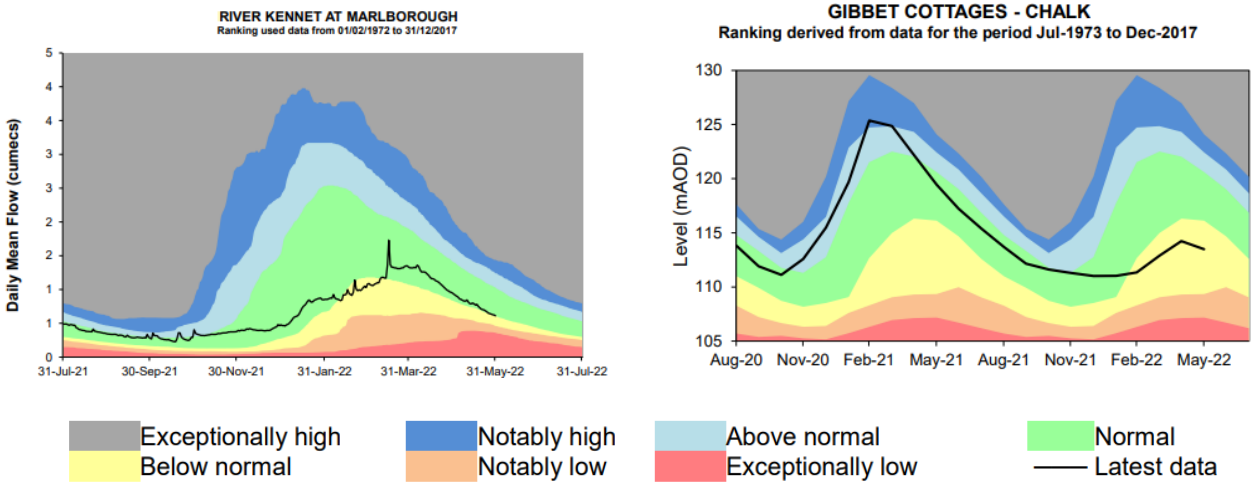


Figure 5B – Upper Lambourn OBH



In addition to these specific stations, the wider groundwater context is illustrated in the Water Situation Report for the Berkshire Downs water resources area. The closest groundwater reference station is Gibbet Cottages. This site shows significantly lower overall groundwater than the previous year. This can be seen in the figure below alongside the river indicator location at Marlborough on the River Kennet.

Figure 6 – Water Situation Report



Extract from - [Water Situation Report (publishing.service.gov.uk)]

Network Performance

Within the East Shefford catchment there is one site detailed within the Environment Agency Consents Database which has an Event Duration Monitor (EDM) fitted.

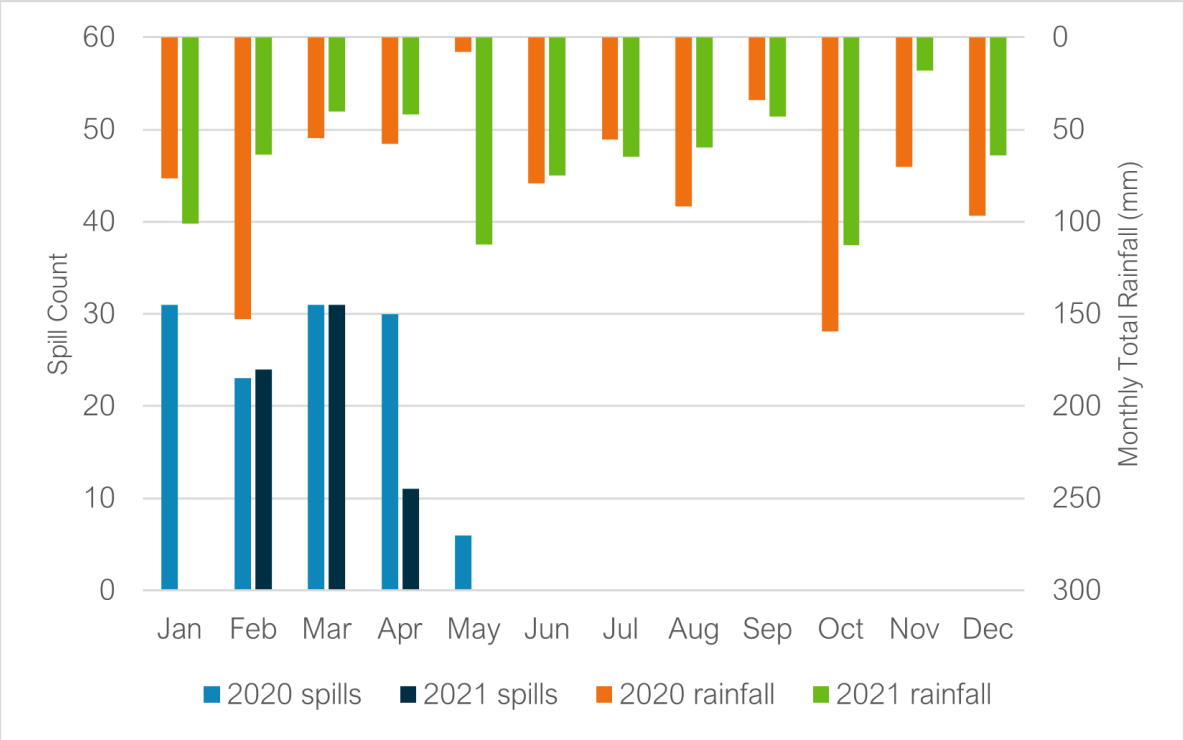
Table 7 below details the last 2 years performance of overflows within the catchment.

Table 7 – Event Duration Monitoring

Overflow	2020		2021	
	Spills	Duration (hours)	Spills	Duration (hours)
East Shefford STW	121	2753.49	66	1424.02

A critical part of the assessment of EDM performance and its relation to groundwater inundation is to review the month-on-month spill performance, against previous years and the monthly total rainfall values to give context to the performance. Figure 8 below presents the EDM performance trend and rainfall for recent years.

Figure 8 – EDM Monthly Performance



The trend in spill performance suggests a winter focus to spill occurrence at the overflow. The groundwater trend at the Lambourn OBH illustrates the variation in level between 2020 and 2021, which led to more significant spills in 2020 with broadly similar rainfall.

Investigations & Interventions

This section details the activities that have been undertaken within the catchment within the Hydrological Year 2021-22.

Monitor Installations

The sewer depth monitor (SDM) programme supports long term groundwater understanding within GISMP catchments. Currently, there are a total of 20 monitors installed within the East Shefford catchment. There are currently no further monitor installs planned.

The data from these will be cross-referenced with other long-term records (where available) within the catchment.

Remediation Works Undertaken this Hydrological Year

ATAC filtration units were deployed in the catchment on the 20/12/2021 and stood down on 08/04/2022. It did not become necessary to switch these on and no tankers were deployed to the area.

Table 9 below provides a summary of the investigations and remediation works undertaken or planned within the East Shefford catchment in the 2021-22 Hydrological Year.

Table 9 – Works Undertaken in the 2021/22 Hydrological Year

Investigation/ remediation type	Number/ length undertaken
CCTV survey	595 metres
Look and lift survey	N/A
Sewer lining	1372 metres (340 metres completed, 1032 metres due to be completed by end of November 2022).
Patch lining	N/A
Manhole sealing	35 manholes (30 completed, 5 due to be completed by end of November 2022).
Misconnection – removal of surface water from foul system	1

Summary

Rainfall in the East Shefford catchment over the 2021/22 hydrological year has been below average, with groundwater levels in the aquifer beneath East Shefford not reaching the levels seen in previous years which triggered groundwater ingress into the sewerage network.

The sewer lining and manhole sealing programme have been started and will progress into the next hydrological year.

Our operational teams have worked with local stakeholders to improve overland drainage in the area which may be contributing to inundation into the foul system through manholes.

Lift and look and CCTV surveys will continue throughout the remaining wet winter periods with the aim of finding further priority locations for remediation and investigating/justifying the need for future larger scale lining as part of our Price Review (PR) process if required.

Addendum - Annual Update 2023

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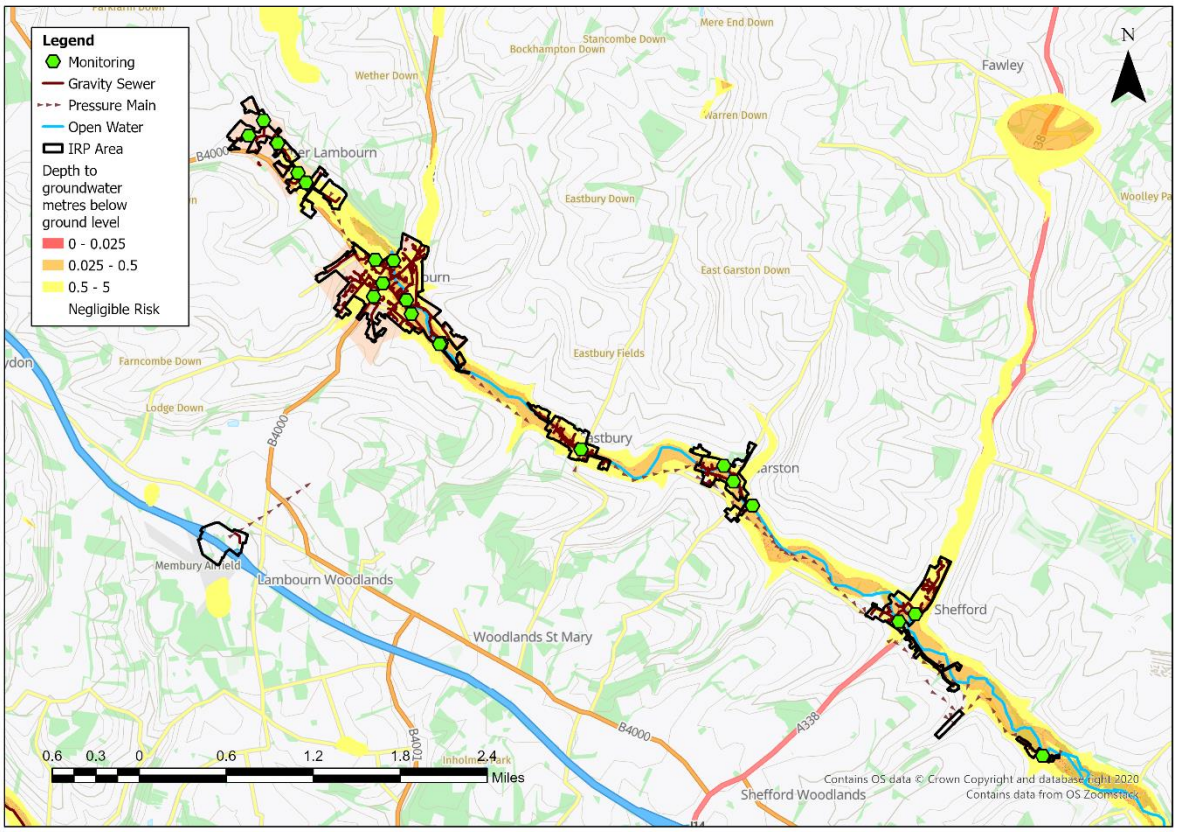
Overview

This addendum to the East Shefford Groundwater Impacted System Management Plan 2020 (GISMP) provides an update on performance/work undertaken in the Hydrological Year October 2022 to September 2023. The key points covered include:

- Hydrological conditions
- Performance of the sewerage system
- Mitigation / remedial measures progressed over the last year and being planned
- Summary and plan for 2023/24

Figure 1 – East Shefford Monitoring Plan



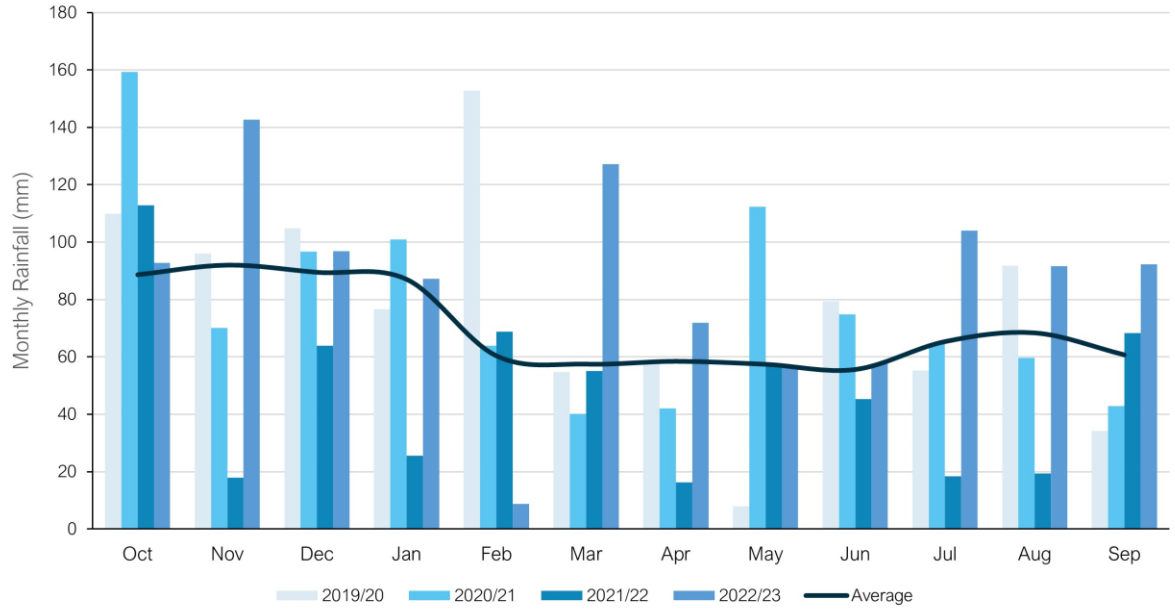
Hydrological Review – 2022-2023

This section summaries the hydrological conditions within the East Shefford catchment within the period under investigation and provides comparison against previous year's performance to put the annual performance into context. The hydrological review has been undertaken based on the Hydrological Year which runs October 1st to September 30th.

Catchment Rainfall

Representative Radar rainfall has been used to generate monthly data at catchment level for comparison with average data generated by local Met Office Weather Station Records. Figure 2 presents the comparison of this data for the last four hydrological years to support longer term trends within the local system.

Figure 2 – Monthly Rainfall Performance



Average Values taken from Met Office Weather Station at Marlborough based on the period 1991-2020

The total rainfall for the 2022/23 hydrological year is 22% above the annual average total. Total rainfall values are presented in Table 3 below.

Table 3 –Total Rainfall Based on Hydrological Year

Average (mm)	2019/20 (mm)	2020/21 (mm)	2021/22 (mm)	2022/23 (mm)
841	921	928	568	1029

Groundwater / Local River Level

The East Shefford catchment is situated in the Berkshire Downs water resources area. It primarily sits in the New Pit Chalk Formation and Seaford Chalk Formation. These are generally comprised of carbonate material forming distinctive beds of chalk. The formations are dedicated principal aquifers within the UK.

The Environment Agency has gauging stations on local watercourses measuring stage and observation boreholes (OBH) measuring groundwater levels locally to the catchment which can be used to provide indicative local groundwater performance.

From previous investigations we have identified the following sites are good indicators of groundwater levels within the catchment.

- River Lambourn, Lambourn.
- Upper Lambourn OBH.

These sites are illustrated in Figure 4 below, alongside the closest groundwater reference station and closest gauging station from the Water Situation Report.

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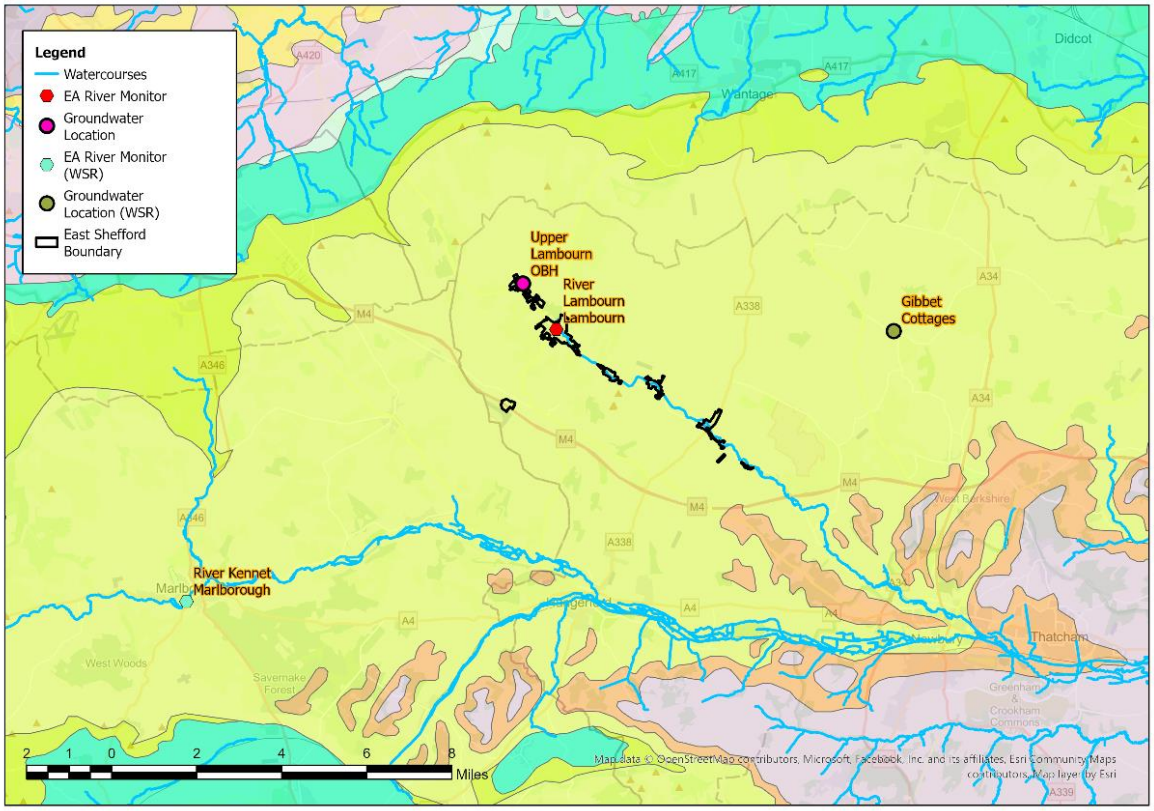


The following figure represents the last three hydrological years of level information at the indicator site to build a picture of the relative conditions prevalent in the current year. It is presented against both the daily total rainfall values for the catchment and a rolling 15 day total rainfall.

Figure 5A – River Lambourn at Lambourn

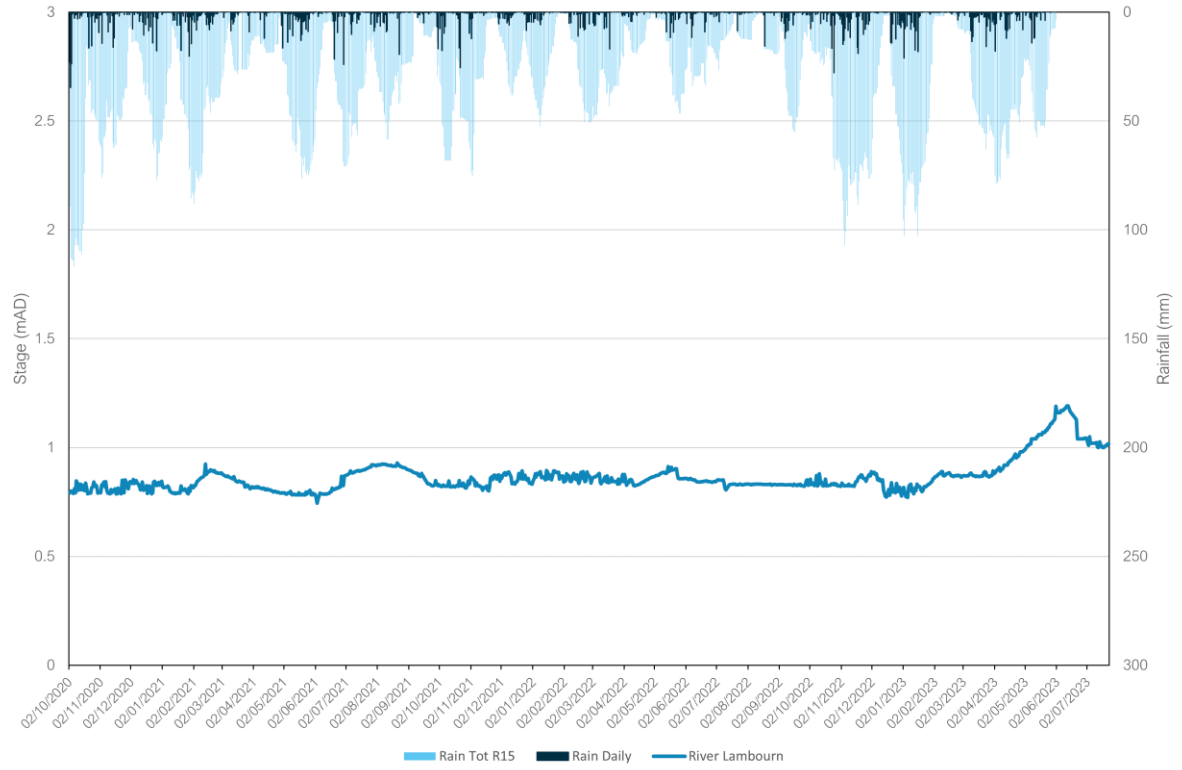
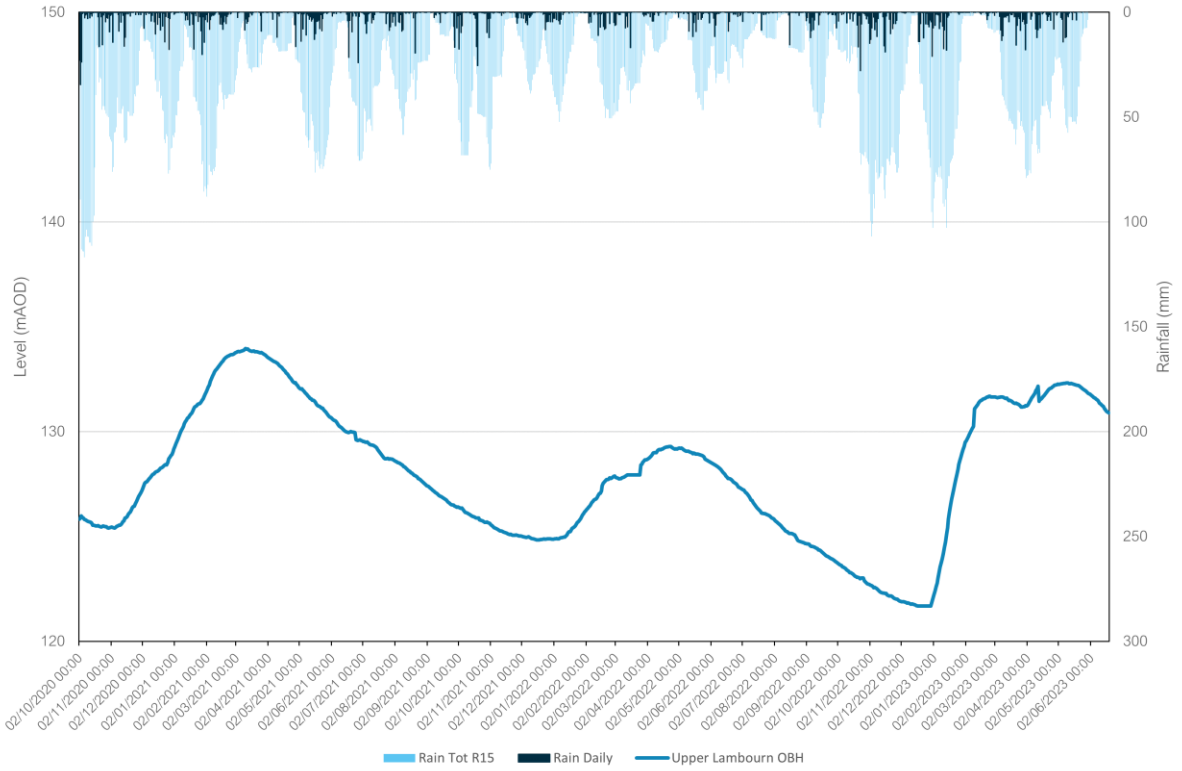
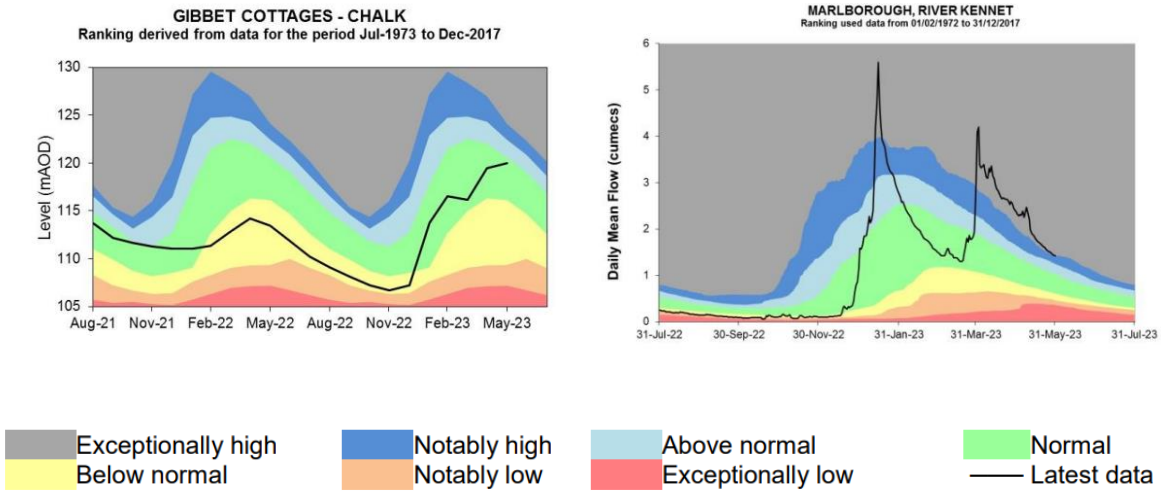


Figure 5B – Upper Lambourn OBH



In addition to these specific stations, the wider groundwater context is illustrated in the Water Situation Report for the Berkshire Downs water resources area. The closest groundwater reference station is Gibbet Cottages. This site shows groundwater levels consistently below normal in 2022. Groundwater levels rise towards the end of 2022 and are observed at normal levels in 2023. This can be seen in the figure below alongside the river indicator location at Marlborough on the River Kennet.

Figure 6 – Water Situation Report



Extract from - [Water Situation Report (publishing.service.gov.uk)]

Network Performance

Within the East Shefford catchment there are two sites detailed within the Environment Agency Consents Database which have an Event Duration Monitor (EDM) fitted.

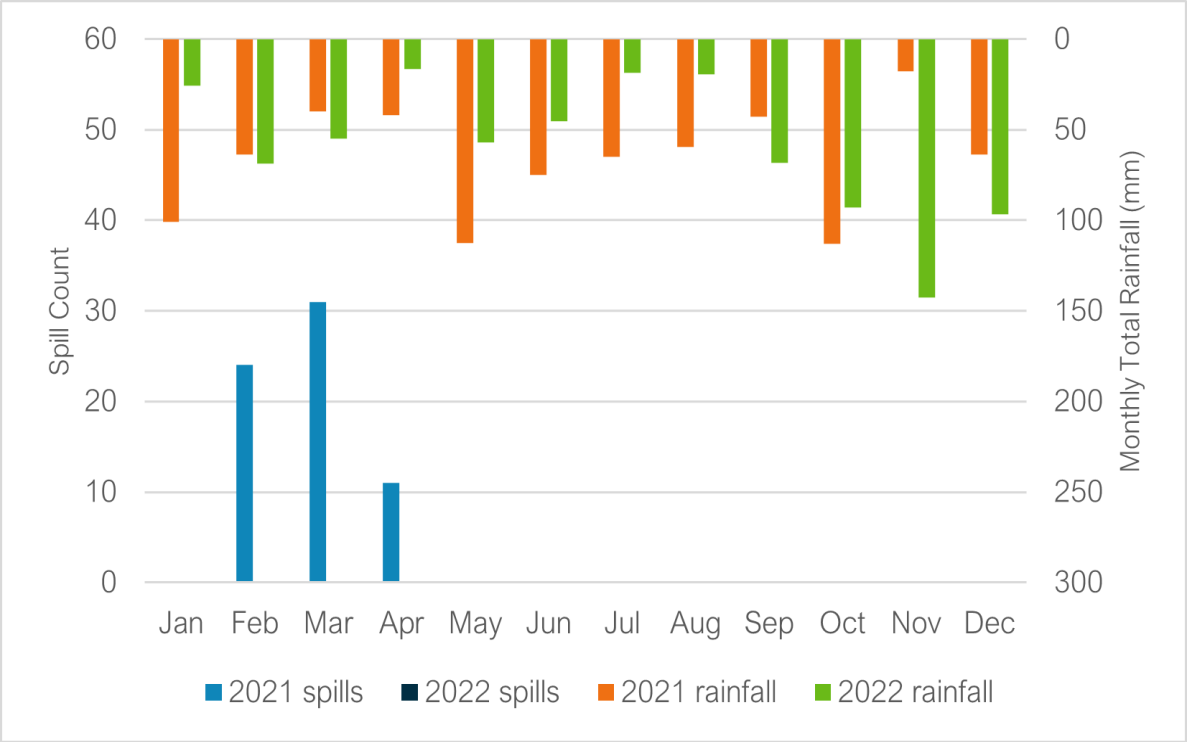
Table 7 below details the last 2 years performance of overflows within the catchment.

Table 7 – Event Duration Monitoring

Overflow	2021		2022	
	Spills	Duration (hours)	Spills	Duration (hours)
East Shefford STW	66	1424.02	0	0.00

A critical part of the assessment of EDM performance and its relation to groundwater infiltration is to review the month-on-month spill performance, against previous years and the monthly total rainfall values to give context to the performance. Figure 8 below presents the EDM performance trend and rainfall for recent years.

Figure 8 – EDM Monthly Performance



The data suggests a wider relationship between rainfall totals, elevated groundwater levels and spill frequency. No spills were recorded at East Shefford STW in 2022, compared to 66 spills in 2021, all of which occurred during the February – April period. The Upper Lambourn OBH indicator site shown in Figure 5, suggests groundwater levels in the catchment were particularly elevated during this period, and significantly higher than the same period in 2022, when Figure 6 suggests groundwater levels in the catchment were below normal.

As part of the process of matching EDM sites to GISMP catchments, one additional site was identified for inclusion in this year's Addendum Report, which was not included in last year's report.

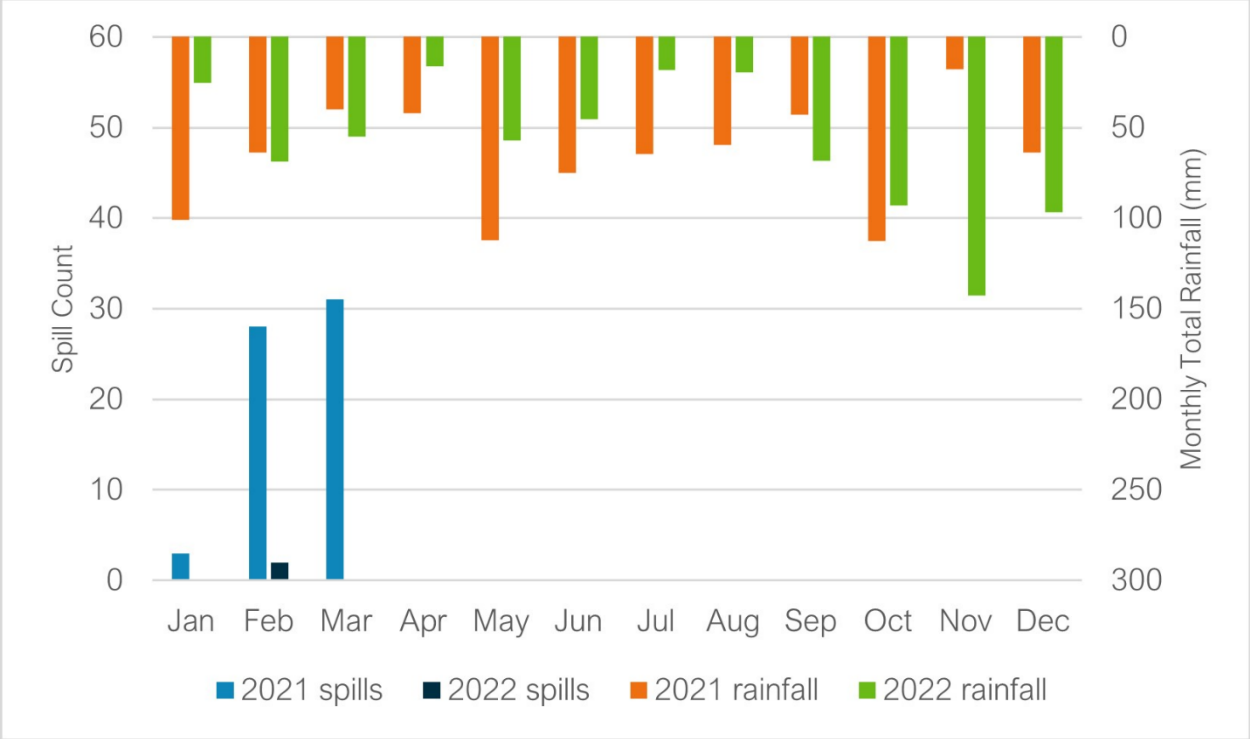
Table 9 below details the last 2 years performance of overflow 'East Garston SPS'. Note that the spill frequency of 68 stated for 2021, is lower than the value of 104 stated in the Annual Return. The data has been revised/ revalidated, and 68 is the post-validation value.

Table 9 – Event Duration Monitoring

Overflow	2021		2022	
	Spills	Duration (hours)	Spills	Duration (hours)
East Garston SPS	68	1596	2	5.89

Figure 10 below presents the EDM performance trend and rainfall for 2022.

Figure 10 – EDM Monthly Performance



As with East Shefford STW, the EDM data for East Garston SPS, suggests a wider relationship between rainfall totals, elevated groundwater levels and spill frequency. Only two spills were recorded at the overflow in 2022, with Figure 6 suggesting groundwater levels were consistently below normal level in the catchment during this period. This compares to 68 spills recorded January – March 2021. The indicator site data shown in Figure 5, suggests groundwater levels in the catchment were significantly higher than within the same period in 2022. However, note that tankering has been undertaken at the SPS, which could potentially mask some of the groundwater impact on spills at the overflow.

Investigations & Interventions

This section details the activities that have been undertaken within the catchment within the Hydrological Year 2022-23.

Monitor Installations

The sewer depth monitor (SDM) programme supports long term groundwater understanding within GISMP catchments. Currently, there are a total of 20 monitors installed within the East Shefford catchment. There are currently no further monitor installs planned.

The data from these will be cross-referenced with other long-term records (where available) within the catchment.

Remediation Works Undertaken this Hydrological Year

Table 11 below provides a summary of the investigations and remediation works undertaken or planned within the East Shefford catchment in the 2022-23 Hydrological Year, as well as works undertaken in the 2021-22 Hydrological Year and in the 2020-21 Hydrological Year.

Table 11 – Works Undertaken in the 2022/23 Hydrological Year, in the 2021/22 Hydrological Year & in the 2020/21 Hydrological Year

Investigation/ remediation type	Number/ length undertaken 20/21	Number/ length undertaken 21/22	Number/ length undertaken 22/23
CCTV survey	N/A	595 metres	N/A
Look and lift survey	N/A	N/A	7 surveys
Sewer lining	144 metres	340 metres	916 metres*
Patch lining	N/A	N/A	1
Manhole sealing	1 manhole	30 manholes	2 manholes*
Misconnection – removal of surface water from foul system	N/A	1	N/A

*Interventions detailed as outstanding in last year's Addendum Report

Note that the ATAC unit in the catchment was not utilised over the 2022/23 Hydrological Year.

In addition to the interventions highlighted above, this system may be subject to further lining in AMP8 as part of our WINEP storm overflow spill reduction plan. This plan is part of our Price Review (PR)24 plan which has been submitted to Ofwat for approval.

East Shefford STW is also being upgraded at a cost of more than £10 million. This project will result in a higher quality of treated effluent being discharged to the watercourse. The project is due to be completed in 2023.

Summary

Indicator site data suggests groundwater levels in the East Shefford catchment were generally lower in 2022 than in 2021, with EDM data strongly indicative of the role of groundwater infiltration on overflow spills in the catchment. This hydrological year, indicator site data suggests groundwater levels have generally been higher than the previous hydrological year, and EDM data for 2023 will be analysed once available to continue to examine the relationship between groundwater levels and overflow spills in the catchment.

The sewer lining and manhole sealing programme have been started and will progress in AMP7 and into the first year of AMP8.

Our operational teams have also worked with local stakeholders to improve overland drainage in the area which may be contributing to infiltration into the foul system through manholes.

Lift and look and CCTV surveys will be undertaken in remaining wet winter periods if conditions allow The aim of this is to find further priority locations for remediation and investigating/justifying the need for future larger scale lining as part of our Price Review (PR) process if required.

Addendum - Annual Update 2024

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Overview

This addendum to the East Shefford Groundwater Impacted System Management Plan 2020 (GISMP) provides an update on performance/work undertaken in the Hydrological Year October 2023 to September 2024. The key points covered include:

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- Performance of the sewerage system
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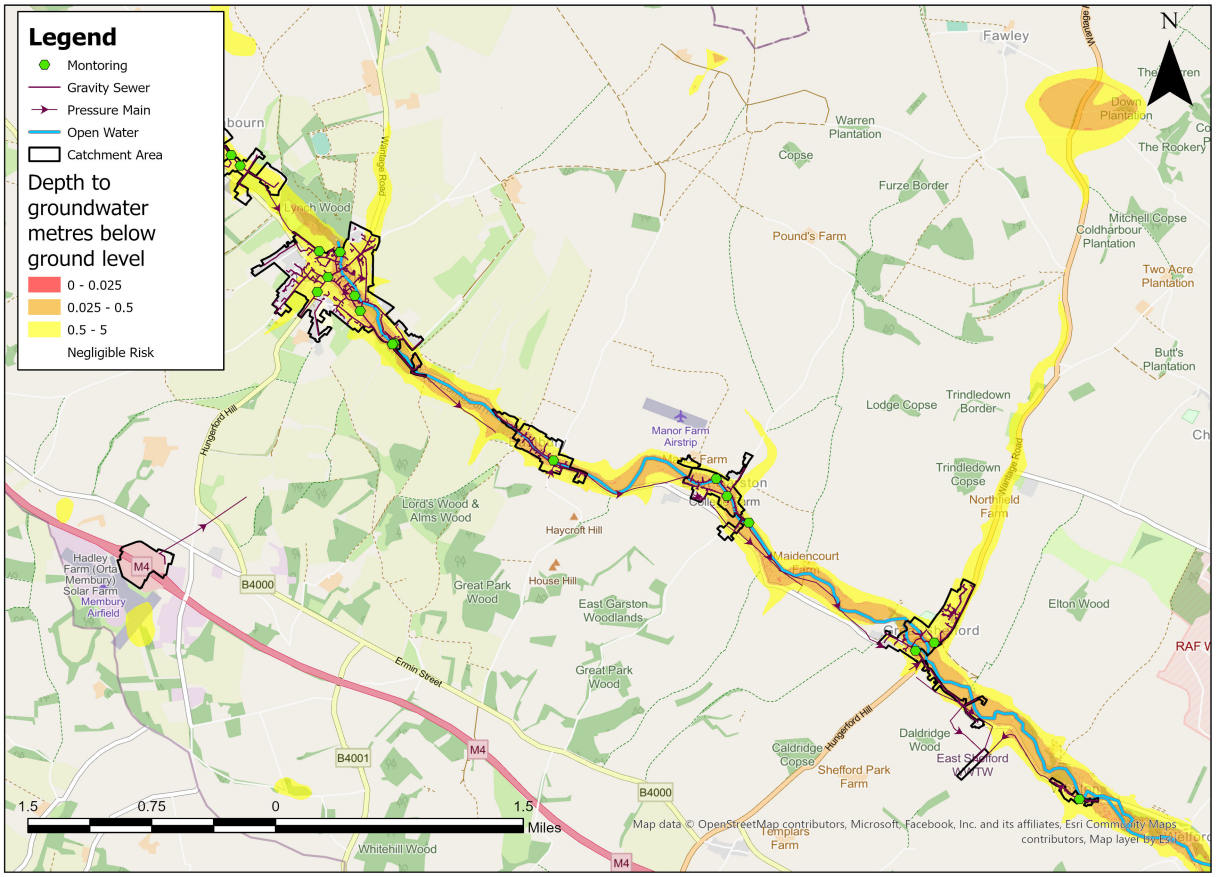
- Summary and plan for 2024/25

Figure 1 – East Shefford Monitoring Plan



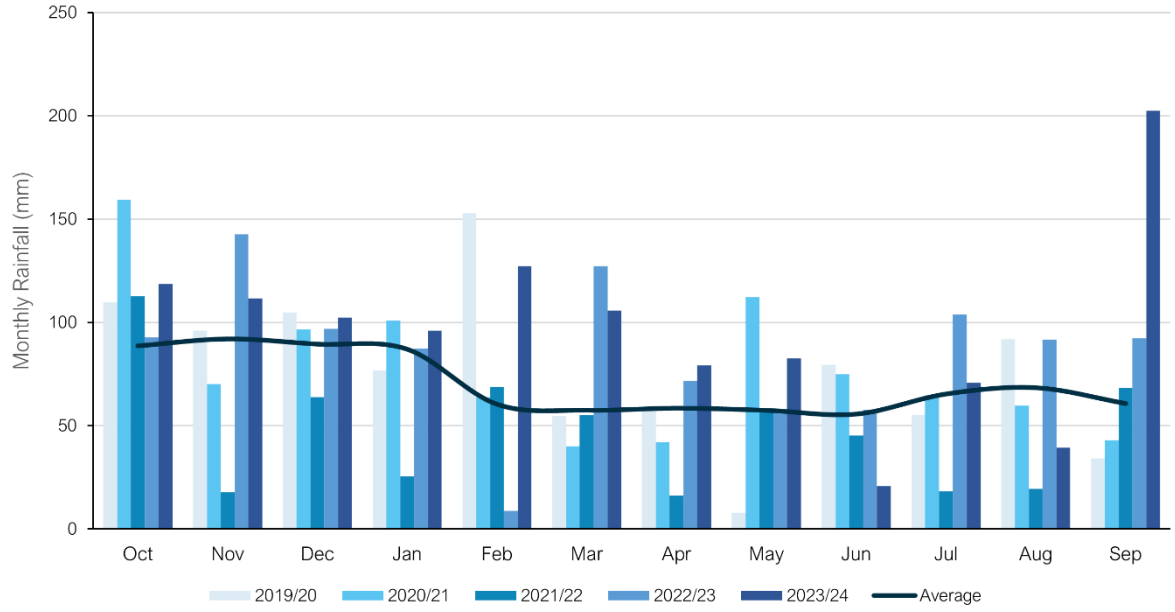
Hydrological Review – 2023-2024

This section summarises the hydrological conditions within the East Shefford catchment within the period under investigation and provides comparison against previous year's performance to put the annual performance into context. The hydrological review has been undertaken based on the Hydrological Year which runs October 1st to September 30th.

Catchment Rainfall

Representative Radar rainfall has been used to generate monthly data at catchment level for comparison with average data generated by local Met Office Weather Station Records. Figure 2 presents the comparison of this data for the last five hydrological years to support longer term trends within the local system.

Figure 2 – Monthly Rainfall Data



Average Values taken from Met Office Weather Station at Marlborough based on the period 1991-2020

The total rainfall for the 2023/24 hydrological year is 38% above the annual average total. Total rainfall values are presented in Table 3 below.

Table 3 –Total Rainfall Based on Hydrological Year

Average (mm)	2019/20 (mm)	2020/21 (mm)	2021/22 (mm)	2022/23 (mm)	2023/24 (mm)
841	921	928	568	1029	1157

Groundwater / Local River Level

The East Shefford catchment is situated in the Berkshire Downs water resources area. It primarily sits in the New Pit Chalk Formation and Seaford Chalk Formation. These are generally comprised of carbonate material forming distinctive beds of chalk. The formations are dedicated principal aquifers within the UK.

The Environment Agency has gauging stations on local watercourses measuring stage and observation boreholes (OBH) measuring groundwater levels locally to the catchment which can be used to provide indicative local groundwater performance.

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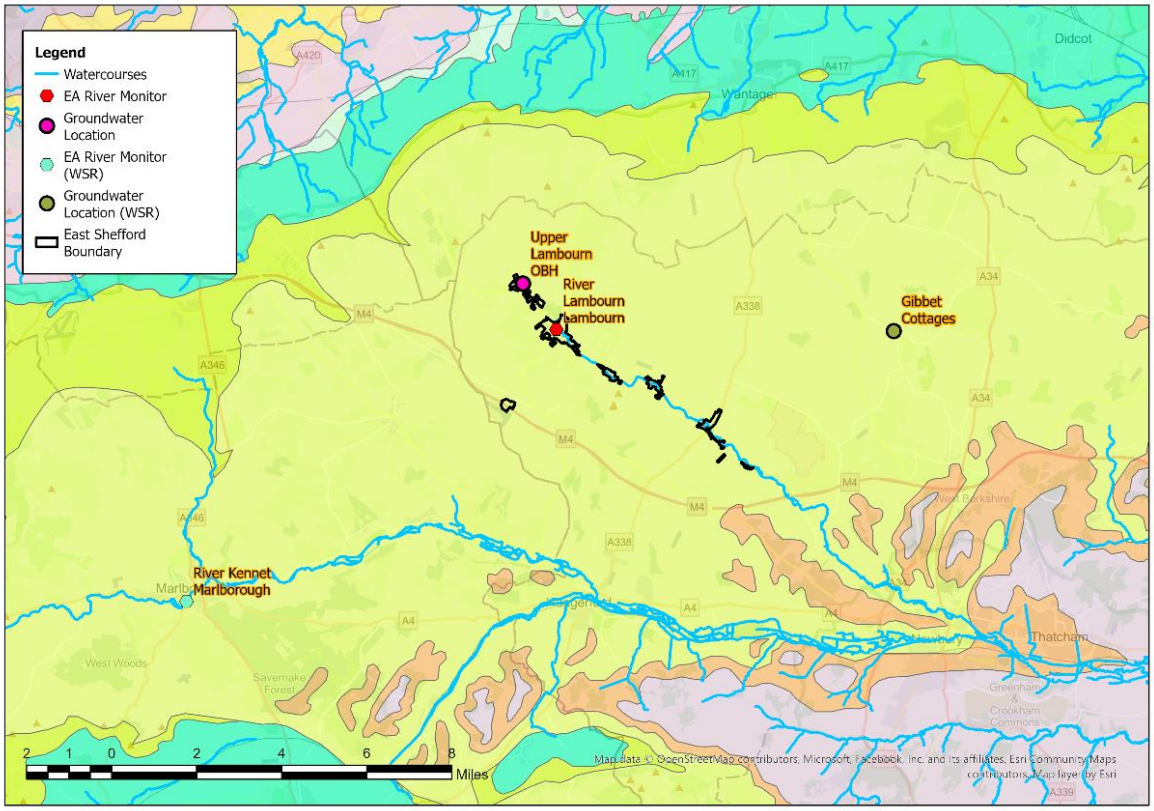


Figures 5A-5B represent the last three hydrological years of level information at the indicator sites to build a picture of the relative conditions prevalent in the current year. It is presented against both the daily total rainfall values for the catchment and a rolling 15 day total rainfall.

Figure 5A – River Lambourn at Lambourn

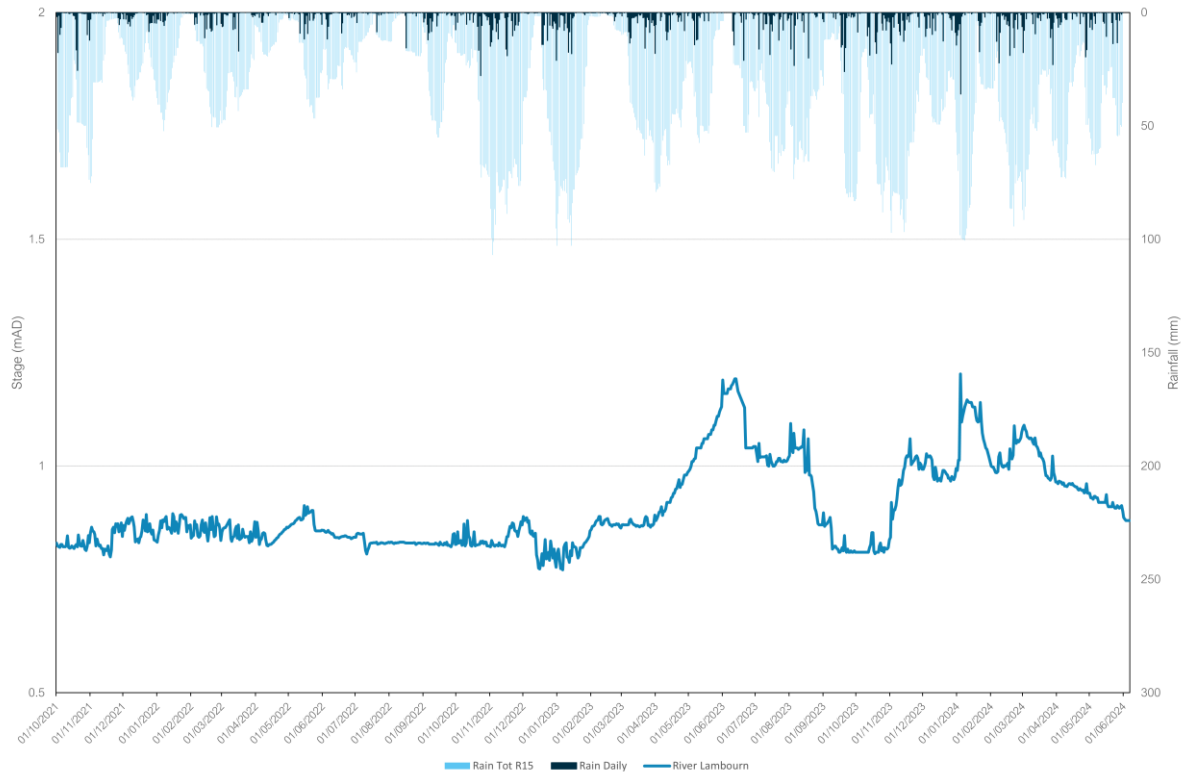
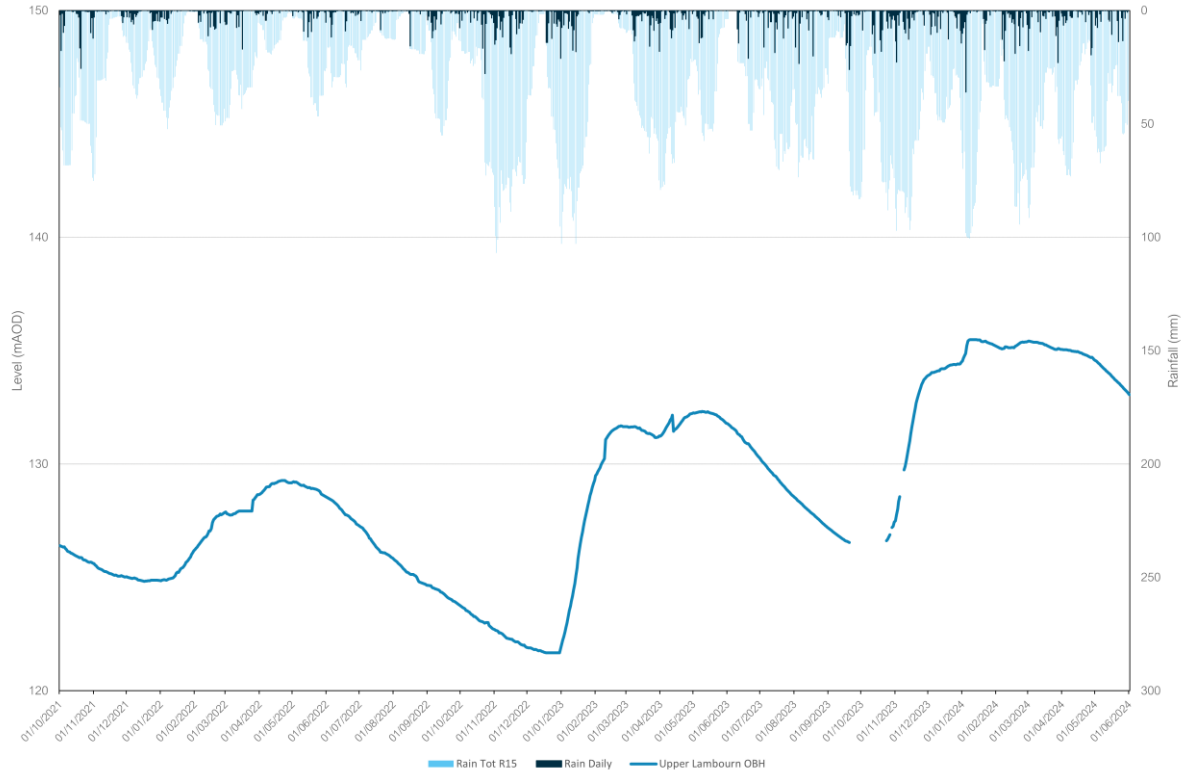
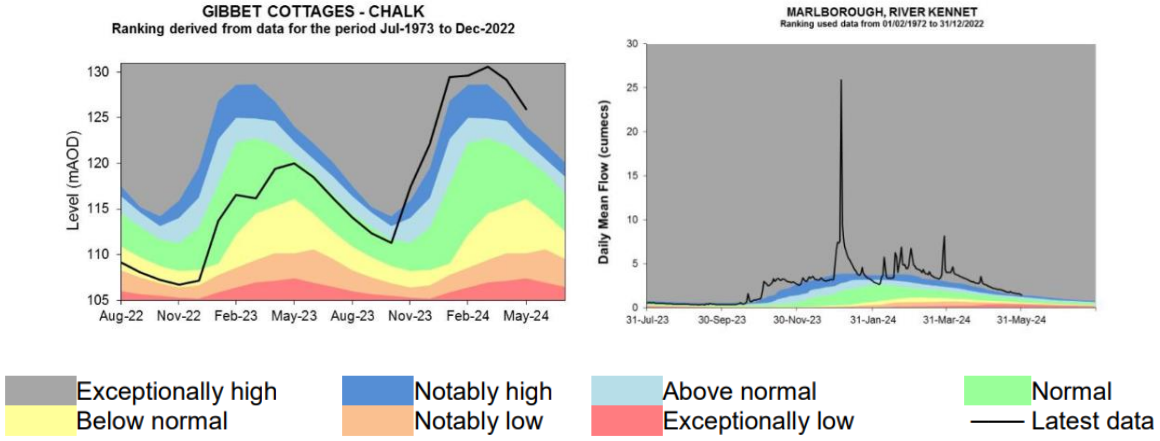


Figure 5B – Upper Lambourn OBH



In addition to these specific stations, the wider groundwater context is illustrated in the Water Situation Report for the Berkshire Downs water resources area. The closest groundwater reference station is Gibbet Cottages. This site shows groundwater levels generally at normal levels throughout 2023, before rising to exceptionally high levels towards the end of the year. Groundwater levels have remained exceptionally high in 2024. This can be seen in Figure 6 alongside the river indicator location at Marlborough on the River Kennet.

Figure 6 – Water Situation Report



Extract from - [Water Situation Report (publishing.service.gov.uk)]

Network Performance

Within the East Shefford catchment there are two sites detailed within the Environment Agency Consents Database which have an Event Duration Monitor (EDM) fitted.

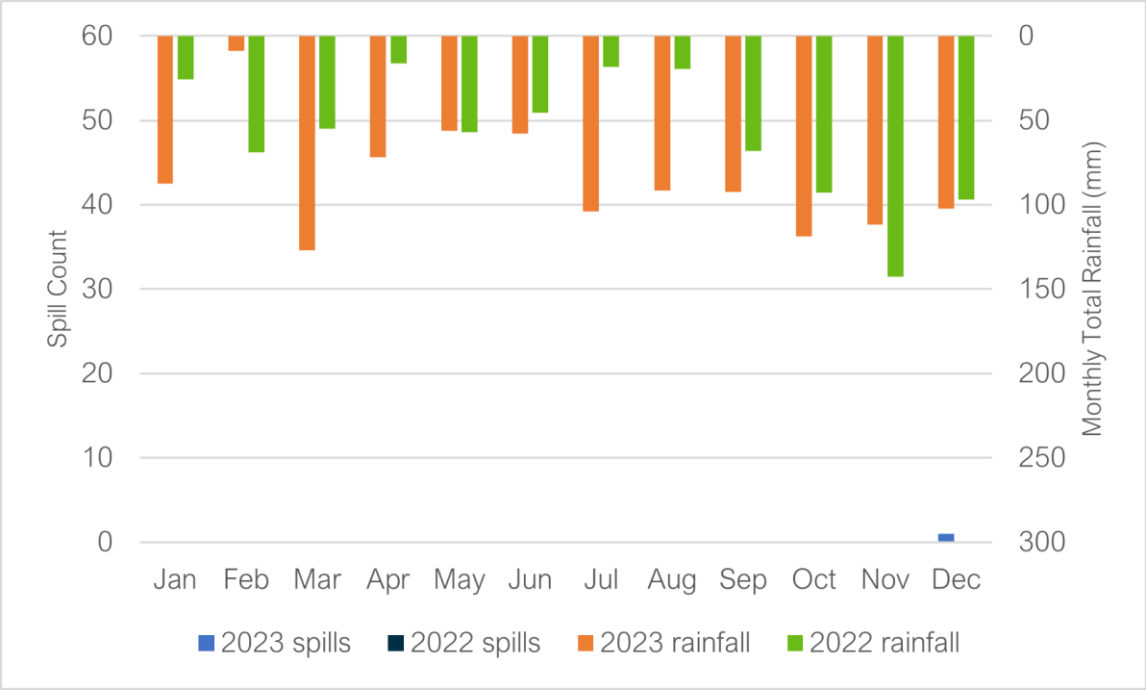
Table 7 below details the last 2 years performance of overflow 'East Shefford STW'.

Table 7 – Event Duration Monitoring

Overflow	2022		2023	
	Spills	Duration (hours)	Spills	Duration (hours)
East Shefford STW	0	0.00	1	2.5

A critical part of the assessment of EDM performance and its relation to groundwater infiltration is to review the month-on-month spill performance, against previous years and the monthly total rainfall values to give context to the performance. Figure 8 below presents the EDM performance trend and rainfall for recent years.

Figure 8 – EDM Monthly Performance at East Shefford STW



No spills were recorded at East Shefford STW in 2022 and only one spill was recorded in 2023. Whilst groundwater levels in the catchment were relatively low in 2022 (see Figure 5B), they were significantly higher in 2023, exceeding the high threshold level for groundwater infiltration into the sewer network in East Garston (assigned as 130.10 mAOD at the Upper Lambourn OBH indicator site) and Lambourn (assigned as 131.00 mAOD at the Upper Lambourn indicator site). Upgrades to East Shefford STW are ongoing, improving the ability of the site to treat the volumes of incoming sewage. The low spill frequency at East Shefford STW in 2023, indicates that the upgrades completed to date at the site, have successfully reduced the spill frequency here. The EDM data for 2024, when indicator site data suggests groundwater levels in the catchment were exceptionally high (see Figure 6), will be analysed once available to continue to understand the impact of the treatment works upgrades completed.

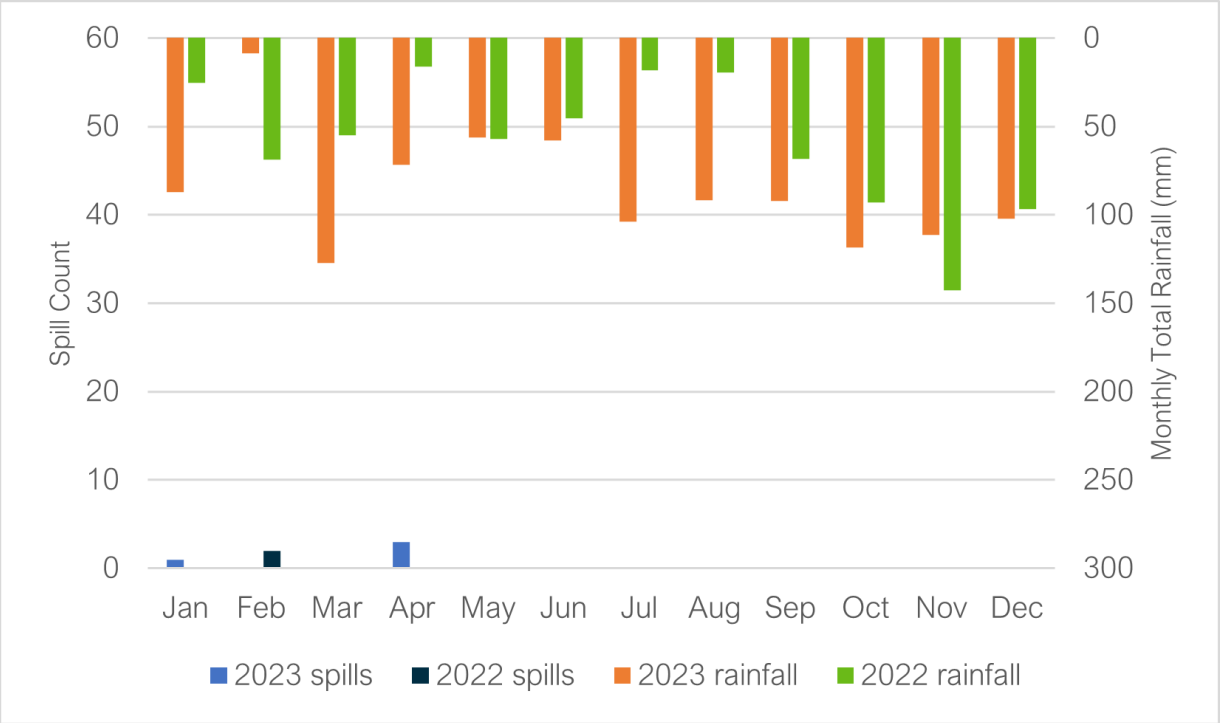
Table 9 below details the last 2 years performance of overflow 'East Garston SPS'. Note that the EDM monitor was only operational for 80% of the year in 2023, which may have impacted the recorded spill frequency for this year.

Table 9 – Event Duration Monitoring

Overflow	2022		2023	
	Spills	Duration (hours)	Spills	Duration (hours)
East Garston SPS	2	5.89	4	51.80

Figure 10 below presents the EDM performance trend and rainfall for 2022 and 2023.

Figure 10 – EDM Monthly Performance at East Garston SPS



A low number of spills were recorded at East Garston SPS in 2022 and 2023. It is therefore difficult to determine a wider relationship between rainfall, elevated groundwater levels and spill frequency at the overflow using the data for 2022 and 2023. However, the majority of spills in 2023 were recorded in April, when Figure 6 suggests groundwater levels in the catchment were at exceptionally high levels. For further discussion regarding the relationship between groundwater levels and spills in the catchment, see the 2023 Addendum Report included in this PDF document.

Investigations & Interventions

This section details the activities that have been undertaken within the catchment within the Hydrological Year 2023-24.

Monitor Installations

The sewer depth monitor (SDM) programme supports long term groundwater understanding within GISMP catchments. Currently, there are a total of 20 monitors installed within the East Shefford catchment. There are currently no further monitor installs planned.

The data from these will be cross-referenced with other long-term records (where available) within the catchment.

Remediation Works Undertaken this Hydrological Year

Table 11 below provides a summary of the investigations and remediation works undertaken or planned within the East Shefford catchment in the 2023-24 Hydrological Year, as well as works undertaken in the previous three hydrological years.

Table 11 – Works Undertaken in the 2023/2024, 2022/23, 2021/22 & 2020/21 Hydrological Year.

Investigation/ remediation type	Number/ length undertaken 20/21	Number/ length undertaken 21/22	Number/ length undertaken 22/23	Number/ length undertaken 23/24
CCTV survey	N/A	595 metres	277 metres	800 metres complete. 1.58 kilometres planned.
Look and lift survey	N/A	N/A	7 surveys	30 surveys
Sewer lining	144 metres	340 metres	916 metres	450 metres planned
Patch lining	N/A	N/A	1	N/A
Manhole sealing	1 manhole	30 manholes	2 manholes	20 manholes planned
Misconnection – removal of surface water from foul system	N/A	1	N/A	N/A

ATAC units were utilised in the catchment during periods of high flows in order to partially treat flows being discharged to the watercourse. The ATAC unit at East Garston was switched on between 02/12/2023 - 03/06/2024. The additional ATAC at Newbury Street, Lambourn was switched on between 02/12/2023 - 05/06/2024. The ATAC at East Garston indicated dissolved oxygen levels to be below 70% on two occasions and Ammonia (NH3) presence was recorded on five occasions at 0.01mg/l. Treated water at the Newbury Street, Lambourn ATAC indicated dissolved oxygen levels below 70% on fifteen occasions and Ammonia (NH3) was recorded on twenty-one occasions at 0.01mg/l or higher.

Tankering was required within the catchment during the 2023/24 Hydrological Year. A total of 426 days of flow management was required at the following locations: Eastbury SPS, Weston SPS, Upper Lambourne 1 SPS, Upper Lambourne 2 SPS and East (Great) Shefford SPS.

In addition to investigations previously detailed, 277 metres of CCTV was undertaken in the catchment over the summer/ autumn 2023 period. The purpose of these surveys was to assess

the structural condition of sewers predicted to be at high risk of groundwater infiltration, rather than to identify locations of groundwater infiltration into the network. All the network surveyed was identified as being in a good structural condition.

In addition to the interventions highlighted above, this system may be subject to further lining in AMP8 as part of our WINEP storm overflow spill reduction plan. This plan is part of our Price Review (PR)24 plan which has been submitted to Ofwat for approval.

East Shefford STW is also being upgraded at a cost of more than £10 million. This project will result in a higher quality of treated effluent being discharged to the watercourse. The project is due to be completed in 2025. Note, delivery dates are being managed at a programme level, delivery dates stated are based upon current views and are subject to change

It is expected that East Shefford STW and East Garston SPS will meet all government targets for storm overflows by 2030.

Summary

This hydrological year, indicator site data suggests groundwater levels in the East Shefford catchment have been significantly higher than the previous hydrological year. The EDM data for 2024 will be analysed once available to continue to examine the relationship between groundwater levels and overflow spills in the catchment and to further understand the impact of upgrade works completed at East Shefford STW.

The sewer lining and manhole sealing programme have been started and will progress in AMP7 and into the first year of AMP8.

Our operational teams have also worked with local stakeholders to improve overland drainage in the area which may be contributing to infiltration into the foul system through manholes.

Lift and look and CCTV surveys will be undertaken in remaining wet winter periods if conditions allow and subject to funding and available capacity. The aim of this is to find further priority locations for remediation and investigating/justifying the need for future larger scale lining as part of our Price Review (PR) process if required.

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