

Piddle Valley Inflow Management Plan

Report 2022/2023

Scheme Ref: C00190



Document Control

Project no: C00190

Project title: Piddle Valley Inflow Management Plan

Area: Southern

Revision History	
Date Issued	Revision Description
2/05/2023	Annual update (draft)

	Prepared (Network Engineer)	Reviewed (Project Manager)	Reviewed (Wastewater Regulation Adviser)	Approved (Sewerage Planning Manager)
Name	Y. Tanner	H. Wheeler	A. Mears	D. Martin
Agreed on (Date)	18/04/2023	19/04/2023	2/05/2023	2/05/2023

Contents

Introduction	4
Section 1 History of the Piddle Valley	6
1.1 Background	6
1.2 Summary of Historical Works	6
Section 2 Works undertaken in 2022/2023	10
2.1 CCTV	10
2.2 Sewer rehabilitation works	10
2.3 Operational Mitigation Action Plans (OMAP)	11
2.4 Communication and visibility of our plans	11
2.5 Monitoring groundwater levels	12
2.7 Sampling water quality	14
Section 3 Reactive operational work and customer contacts	17
3.1 Reactive operational work	17
3.2 Customer contacts	17
3.3 Stakeholder and liaison meetings	17
Section 4 Future works	19
Appendix 1 Piddle Valley Inflow Management / Infiltration Reduction Plan	20
Appendix 2 Operational Mitigation Action Plan (OMAP) Piddletrenthide	32
Appendix 3 Operational Mitigation Action Plan (OMAP064) Piddlehinton	37
Appendix 4 Boreholes vs RPS Pump Run Times	41
Appendix 5 Sampling Locations	43
Appendix 6 Sampling Results	45
Appendix 7 Piddlehinton WRC Permit Limits	48
Appendix 8 Groundwater Liaison	51
Appendix 9 Piddletrenthide Case Study	52
Appendix 10 Infiltration Investigations and Sealing	53

Introduction

The Piddle Valley is situated in West Dorset and the topography is such that the hills slope down sharply into a flat river valley. The slopes and crests are mostly comprised of shallow well-drained calcareous silty soils over chalk, whilst the valley bottoms are made up of deep calcareous and non-calcareous fine silty soils.

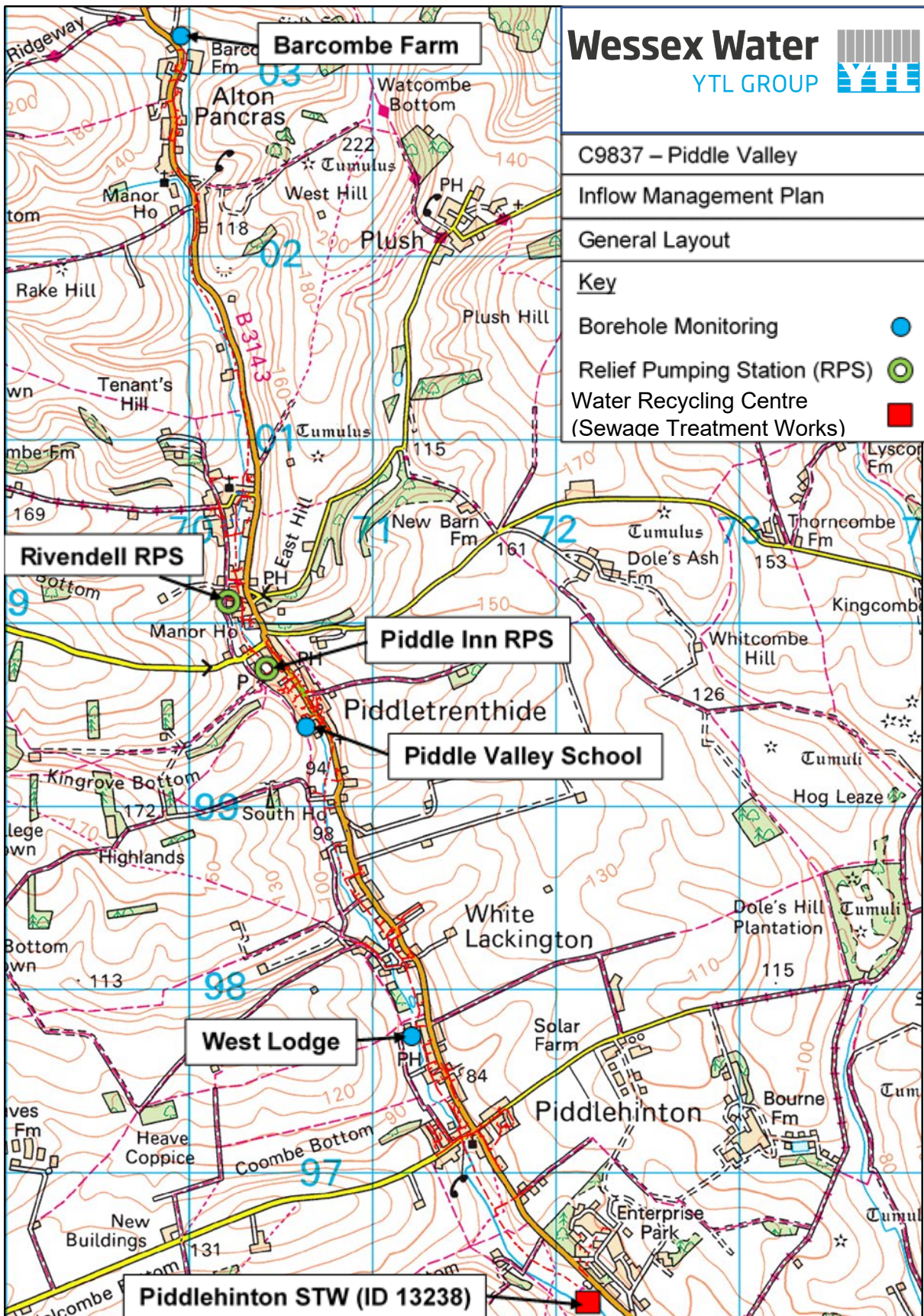
Due to its geology and topography, the Piddle Valley is prone to high water tables during prolonged wet periods. Historically, this has caused many properties within the village of Piddletrenthide to suffer significant flooding due to overland fluvial flow as well as surface and ground inundation of the foul sewer. These flows have consequently resulted in flooding, prolonged overflows, and restricted toilet use.

Efforts have been made by the respective authorities to address these problems. West Dorset District Council and the Environment Agency (EA) have carried out extensive land drainage works to mitigate fluvial flooding and Dorset County Council has made improvements to highway drainage systems to preclude highway runoff. Wessex Water has undertaken significant inspection, cleaning and sealing to ensure the sewer system is watertight as well as constructing two permanent overflows which are permitted to operate during times of groundwater inundation.

Piddlehinton water recycling centre (WRC) receives foul sewage from the Piddle Valley via a 150mm and 225mm public gravity sewer system that is predominantly situated in the valley, adjacent to the river. Foul sewage flows from Alton Pancras in the north via Piddletrenthide, White Lackington and Piddlehinton to the WRC in south (see *Figure 1*).

This annual report provides details of Wessex Water's infiltration reduction activities in the Piddle Valley.

Figure 1: General location plan



Section 1

History of the Piddle Valley

1.1 Background

There has been a seasonal groundwater inundation problem in the Piddle Valley for decades. During the last three decades Wessex Water has made a concerted effort to seal the public foul sewers from ground water infiltration and surface water ingress:

- **1986-1994** - Numerous sewer joints and manholes in the Piddle Valley were sealed under various projects.
- **1994/1995** - A project to seal manhole covers in low lying areas specifically aimed at reducing surface water ingress was undertaken.
- **1997/1998** - Sewer sealing works were carried out using a silicate base flood grouting system.
- **2005-2007** – Further sealing works were completed under a loss of service scheme. This included the air testing and pressure testing of the public sewers.

In 2011, two Ground Water Relief Pumping Stations (RPS) (see **Figure 1**) were built in Piddletrenthide to prevent property flooding during exceptionally wet periods and high groundwater levels. The permanent overflows were constructed to avoid the need to mobilise temporary equipment to pump the groundwater out of the sewers to the adjacent River Piddle. Sampling shows the effects of this operation on river water quality are minimal. This is discussed further in Section 2.

The pumped overflows are permitted by the Environment Agency and can only operate when the flows in the sewer exceed set limits and groundwater levels are above the invert of the surrounding foul sewers (Permit No's EPR/AP3827XC and EPR/AP3822XS).

The Environment Agency permits also require Wessex Water to prepare and implement an 'Inflow Management Plan' - for details see **Appendix 1**. This includes analysing groundwater levels, measuring sewer flows, identifying and eliminating significant infiltration in the public sewers and taking river samples during operation of the pumped relief stations.

1.2 Summary of Historical Works

Following the construction of the pumped relief stations, the works summarised in Table 1 were carried out between 2011 and 2022, as detailed in the previous annual Piddle Valley Inflow Management Plan reports (Table 2).

Table 1: Summary of completed works in previous years

Completed Works 2011-2021/22
<ul style="list-style-type: none"> • A CCTV survey was carried out on 12.8km of public foul sewer and section 105A sewers in the catchment. Numerous blockages, a small amount of infiltration and some breaks/holes were discovered. The sewers were cleaned, and the CCTV survey was repeated, which identified a few more breaks/holes and a further sewer containing infiltration (160m of Section 105A sewers were CCTV surveyed). • Sewer rehabilitation works were carried out involving the sealing of 2 manholes, relining 515m of sewer and subsequently air testing a total length of 75m. • An impermeable area survey was carried out to find if any roof or road gullies were connected to the foul sewerage system. Only a small amount of impermeable area was found to be connected to the foul system. • The private sewers that are now transferred to Wessex Water under “The Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011” (S105A) were proactively surveyed and mapped and Wessex Water’s sewer records updated. • Ultrasonic depth monitors were installed at the pumped relief locations to alert the control room via telemetry when they operate, and to record the depth of the flow in the sewer. Treated effluent flow is also being recorded at Piddlehinton WRC. • A programme was set up to record ground water levels from a series of boreholes throughout the catchment. These boreholes were monitored manually using a dip tape from June 2008. Auto level loggers were installed in all the boreholes in Piddle Valley (Barcombe Farm – July 2012, Piddle Valley School – February 2013, West Lodge – November 2013) which now take readings every 15 minutes. • Sampling points were established and agreed between Wessex Water and the Environment Agency (as shown in Appendix 4) to sample the discharges once a fortnight during operation as per the permit conditions. Wessex Water also agreed to attempt to take samples from the flood defence discharge point. • Wessex Water consulted widely with the stakeholders, holding meetings with Dorset County Council, West Dorset District Council, and the Environment Agency. Regular steering group liaison meetings have been held (<i>see appendix 8</i>) • Wessex Water liaised internally through regular meetings between Planning, Asset Management, Compliance, Sustainability, Water Resources, Supply, Engineering and Construction teams. • An article was published in the local parish magazine and on the Piddle Valley website regarding efforts that are being made by Wessex Water to reduce groundwater infiltration in the foul sewers. • Tankering and over pumping has been carried out to protect public health during times of high sewer levels. • A case study report was prepared and is used widely (<i>See Appendix 9</i>). • Further frequent targeted CCTV has been undertaken and sewer rehabilitation work undertaken where necessary.

- External consultants reviewed the hydraulic computer model and developed a series of proposals that could relieve the valley from the sewerage inundation.
- A groundwater modelling appraisal was undertaken in 2016/17 by external consultants to review the feasibility of lowering the groundwater at various points throughout the catchment. The hydrological model is based on the groundwater model built by the Environment Agency.
- In January 2017 strategic, sustainable and alternative solutions were reviewed and estimated, the strategic solutions that did not involve further ground water relief pumping stations cost between £5.3m and £9.3m (excluding costs for upsizing WRC to facilitate extra flows), whereas the provision of two more permanent groundwater pumped relief stations would cost £0.5m to £0.8m.
- Further targeted inspections, where appropriate, using CCTV equipment to identify further sources of groundwater infiltration. Reviewed the CCTV survey completed in 2022 to identify any infiltration in Piddletrethide.
- Continued to monitor the Barcombe Farm borehole levels as a trigger for preparedness against flooding issues within the Piddle Valley Catchment.
- Continued liaison with stakeholders through the Lead Local Flood Authority and Parish Council, as appropriate
- Worked with the WaterUK group to promote education of groundwater inundation issues and develop a storyboard on the subject.
- Continued to deliver the Inflow Management Plan (Appendix 1).
- Continued to monitor the groundwater relief stations on our event duration monitor (EDM) program. The spill frequency and duration figures are reported to the Environment Agency annually.
- The draft DWMP was made publicly available in 2022
- Acted as Water Company representative on the Environment Agency led Groundwater research steering group to promote the challenges of groundwater flooding.

Table 2: Summary of previous reports

Year	Wessex Water Report Ref	Access to previous reports
2011/2012	C9837-284970845-26	These reports are available upon request. Please email: DWMP@wessexwater.co.uk
2012/2013	C9837-284970845-28	
2013/2014	C9837-284970845-27	
2014/2015	C9837-284970845-29	
2015/2016	C9837-284970845-22	
2016/2017	C9837-284970845-21	
2017/2018	C9837-284970845-81	
2018/2019	C9837-284970845-84	
2019/2020	C9837-284970845-88 v 0.16	
2020/2021	C9837-284970845-88 v 1.0	
2021/2022	C9837-284970845-88 v 1.9	
2022/2023	C9837-284970845-88 v 2.0	

Section 2

Works undertaken in 2022/2023

In summary, the following work was carried out in 2022/2023 as proposed in the 2021/2022 Piddle Valley Inflow Management Plan report:

- Continued to deliver the Inflow Management Plan.
- Further targeted inspections, where appropriate, using CCTV equipment to identify further sources of groundwater infiltration.
- Continued to monitor the Barcombe Farm borehole levels as a trigger for preparedness against flooding issues within the Piddle Valley Catchment.
- Continued liaison with stakeholders through the Environment Agency, Lead Local Flood Authority and Parish Council.
- Published a public version of this report on our website.
- The draft Drainage and Wastewater Management Plan (DWMP) has been made available on the company website with a consultation period carried out prior to completion of the final DWMP. This includes a geospatial portal showing drainage strategies and planning objectives.

2.1 CCTV

Further CCTV has been scheduled to take place in April 2023 in the lengths surrounding Rectory Road and from Whites Close to Piddlehinton WRC (WR_02062023103947). A number of lengths were surveyed at the end of March 2023 in which one medium displaced joint was found. Also, one instance of infiltration was found through a manhole cover and three lengths were abandoned due to debris.

2.2 Sewer rehabilitation works

No sewer relining has taken place during 2022/23.

Further infiltration sealing has been scheduled to take place during 2023/24 in the Piddle Valley.

2.3 Operational Mitigation Action Plans (OMAP)

Although most central properties in Piddletrenthide are protected by the two permanent pumped relief stations, other areas in the Piddle Valley are still vulnerable to the effects of groundwater inundation.

An OMAP is in place for Egypt, north Piddletrenthide, as part of the Local Emergency Plans (LEPs) for Wessex Water to over-pump into the river where there is a risk of internal flooding or loss of service due to groundwater inundation to protect public health (See **Appendix 2**). This will be used when tankering is no longer deemed to be effective during times of groundwater inundation during wet winters. The OMAP was submitted and reviewed by the EA in 2015.

The OMAPs for Piddletrenthide and Piddlehinton were enacted during the winter period of 2022/23 and tankering took place due to high groundwater levels.

Piddlehinton OMAP was in place between 30/12/2022 to 14/02/2022 and Piddletrenthide OMAP was in place between 20/12/2022 to 30/01/2022.

2.4 Communication and visibility of our plans

WaterUK (the national representation of all water and sewerage companies) has led various sewerage initiatives over recent years. Wessex Water has been closely involved in these including the DWMP framework:

- The DWMP framework was published in September 2018 ([here](#)). This provides a framework for water companies to consistently undertake long term planning and give visibility to stakeholders of these plans.
- Wessex Water staff have previously attended monthly meetings with WaterUK and other companies to establish how these DWMPs will be delivered and presented in a consistent manner.

A number of years ago, Wessex Water created an animation that visualises the complex problems in catchments where groundwater inundation is a problem, such as the Piddle Valley. The video remains available on [YouTube \(here\)](#).

Our website has been expanded to give more visibility to more information, including:

- An Infiltration webpage ([here](#)) with links to the video and summary reports for catchments vulnerable to groundwater inundation
- A DWMP webpage ([here](#)) that includes a geospatial portal showing drainage strategies and case studies.

Figure 2: [Groundwater education video](#)



Wessex Water has continued with its policy of objecting to development in catchments without a groundwater strategy in place.

The new five-day groundwater flood forecasts developed by the local Wessex Environment Agency have been used alongside our existing borehole monitoring program in the Piddle Valley as part of our LEPs to inform tankering and overpumping activities. We continue working closely with the Environment Agency to refine future flood alert thresholds to activate OMAPs based on local boreholes.

Drone footage was captured during elevated groundwater levels during winter 2020/21, the images showed the extent to which the Piddle Valley is affected by groundwater flooding.

2.5 Monitoring groundwater levels

The borehole data from Barcombe farm is analysed weekly (or more frequently during high groundwater events) to facilitate internal groundwater level warnings.

2022-23 was a year of extremes for the Wessex Water region. One of the driest summers since 1976 was followed by the wettest autumn-winter in circa. 10 years. This caused groundwater levels to rise in mid-January to a level comparable with 2013/14, with many catchments suffering from groundwater inundation. As the winter progressed, the driest February in 30 years enabled many sites to recover, before the wettest March since 1981 resulted in a sharp increase in groundwater levels. This late wet period particularly affected sites in the northern and eastern parts of the region.

The Piddle Valley sewers are considered at risk of groundwater inundation once the levels at Barcombe Farm borehole exceed 123m AOD, this “trigger level of preparedness” is to warn Wessex Water Operations that there is an imminent risk and the catchment’s OMAP may need to be instigated.

The trigger levels are estimated from analysis of ground water level trends, previous flooding incident contact information and operational experience. They are now used as an alert for

preparedness for high ground water levels which could necessitate the use of mitigation measures under the OMAP (such as over pumping or tankering the system) to protect public health when the groundwater infiltrates the sewers and overloads the system.

Groundwater levels exceeded the OMAP trigger levels in 2022/2023 and Operations were warned to be prepared for groundwater inundation. The groundwater levels were particularly high between November to January with a peak of 126.81 mAOD measured on 04/01/2023 at Barcombe Farm.

The groundwater reached a low of 123.08 mAOD on 07/03/2023.

Figure 3 demonstrates the correlation between the inflow at Piddlehinton water recycling centre, groundwater levels at Barcombe Farm Borehole since the installation of the data logger in July 2012 and average rainfall taken from three nearby rain gauges (Friar Waddon, Evershot and Kingstag Ridge).

In order to analyse flooding in relation to groundwater, customer contacts have been added to the graph showing when reported flooding occurs and whether it is due to inadequate hydraulic capacity (IHC) or other causes such as blockages.

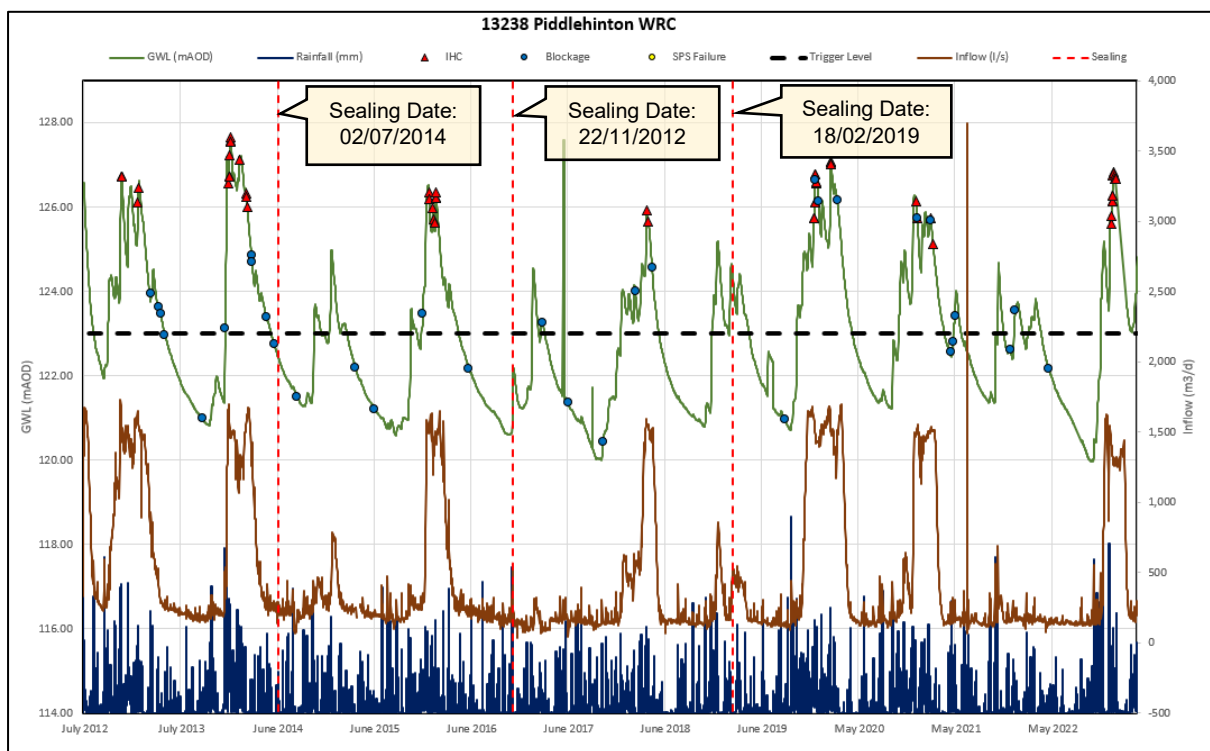


Figure 3: Piddlehinton WRC inflow, rainfall, and groundwater levels at Barcombe Farm

Graphing the ground water levels against the daily pump run-stops for the pumped relief stations demonstrates that the pumps operated for long periods during times when the ground water level was exceptionally high.

Appendix 4 shows the borehole levels for Barcombe Farm, West Lodge and Piddletrenthide School graphed against the sump and pump run times for the two relief pump stations. *Note:*

rainfall has been inverted, scaled and averaged over a month to indicate catchment wetness. IHC is flooding incidents reported due to inadequate hydraulic capacity.

The groundwater relief stations were added to our event duration monitor (EDM) program. The spill frequency and duration figures are reported to the Environment Agency annually. The EDM figures from 01/04/2022 – 31/03/2023 are in table 3 below.

Table 3: Pumped relief stations EDM

ID	Site Name	Permit No	Durn Hrs	12/24 Spill Count	% of reporting period EDM operational
17637	RIVENDELL (CSO4) CSO	EPR/AP3827XC	955.25	42	100.0%
17638	R/O TRENT HOUSE (CSO6) CSO	EPR/AP3822XS	1,064.00	47	100.0%

Data for period 01/04/2022 – 31/03/2023

Annual flows to the treatment works are summarised in the **Table 4** below.

Table 4: Annual flows to Piddleshinton WRC

Year	Total Flow to WRC (m3)
2009/10	194,123
2010/11	100,563
2011/12	74,152
2012/13	313,465
2013/14	203,723
2014/15	119,292
2015/16	174,155
2016/17	72,635
2017/18	101,438
2018/19	136,495
2019/20	256,088
2020/21	203,390
2021/22	68,218
2022/23	160,099

Reporting year – April 1st – March 31st

Table 5: Yearly incidents due to IHC, Piddleshinton WRC Catchment

	IHC Incidents												Total
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Reported incidents	4	3	11	0	10	0	2	9	6	3	0	14	44

2.7 Sampling water quality

During wet weather/ high groundwater level periods, the relief pumping stations are required to operate to lower the sewer levels for the catchment. During pumped relief operation, river water quality samples are taken every fortnight as stipulated in the Discharge Permit.

This sampling has shown that the relief stations flow has had minimal effect on river water quality and the discharges are of similar quality to the fully treated sewage works effluent produced at Piddleshinton WRC, some 4km downstream of the relief pumping stations.

The relief pumping stations (Rivendell CSO4 and Piddle Inn CSO6) operated between December 2022 to February 2023, **Table 6** shows the results from the sampling carried out during this time.

Table 6: Water quality sampling summaries

River Piddle at Piddletrenthide 100m u/s of Rivendell Relief Pumping Station				
Date	BOD atu	Susp solids	Ammonia as N	Tot oxid N
19/12/19	<4.0	8	<0.020	6.5
30/12/19	<2.0	8	<0.020	7
20/01/20	<2.0	9	<0.020	7.3
31/01/20	<2.0	8	<0.020	7.5
24/02/20	<2.0	<5	0.04	7
24/03/20	<2.0	6	<0.020	7.6
21/12/21	2	13	0.04	5.2
04/01/23	<2.0	14	<0.020	7.0
17/01/23	<2.0	14	<0.020	7.1
02/02/23	<2.0	8	<0.020	7.2
16/02/23	<2.0	8	<0.020	7.0

River Piddle at Piddletrenthide 150m u/s of the Piddle Inn PRS				
Date	BOD atu	Susp solids	Ammonia as N	Tot oxid N
19/12/19	<2.0	13	0.02	6.2
30/12/19	<2.0	9	0.04	6.8
20/01/20	<2.0	8	0.03	7.3
31/01/20	<2.0	7	0.03	7.4
24/02/20	<2.0	5	0.03	6.9
24/03/20	<2.0	6	<0.020	7.4
21/12/21	<2.0	9	<0.020	7.2
04/01/23	<2.0	14	<0.020	6.8
17/01/23	<2.0	10	<0.020	6.9
02/02/23	<2.0	8	<0.020	6.9
16/02/23	<2.0	8	<0.020	7.1

River Piddle at Piddletrenthide 100m d/s of the Piddle Inn PRS				
Date	BOD atu	Susp solids	Ammonia as N	Tot oxid N
19/12/19	3	9	0.28	6.2
30/12/19	4	12	0.31	6.5
20/01/20	<2.0	8	0.04	7.2
31/01/20	<2.0	8	0.03	7.3
24/02/20	2	7	0.09	6.6
24/03/20	<2.0	6	0.02	7.4
21/12/21	<2.0	10	<0.020	7.1
04/01/23	<2.0	13	<0.020	6.7
17/01/23	<2.0	7	<0.020	6.6
02/02/23	2.0	8	0.030	6.9
16/02/23	<2.0	8	<0.020	7.0

The flows being discharged to the river are comparable to what is expected from the fully treated final effluent discharge to the river further downstream at Piddlehinton WRC. **Appendix 7** demonstrates this graphically.

Section 3 Reactive operational work and customer contacts

3.1 Reactive operational work

The OMAP was implemented during the winter of 2022/23 in Piddlehinton and Piddletrenthide. Tankering took place during this time to protect public health in Piddlehinton between 30/12/2022 to 12/01/2023.

Both groundwater relief pumping stations (CSO4 and CSO6) operated throughout December, January, and February.

3.2 Customer contacts

Table 7 below shows the type of customer contacts made to Wessex in the winter period of 2022/2023 for the entire Piddlehinton WRC catchment. There were 5 external flooding incidents reported during this time.

Table 7: Flooding incident summary for winter 2022/2023

Incident Type	No.
Flooding Internal	0
Flooding External – Inside Boundary	3
Flooding External – Outside Boundary	2
Blockage / Backing Up	12
Clean Up Enquiry	0

3.3 Stakeholder and liaison meetings

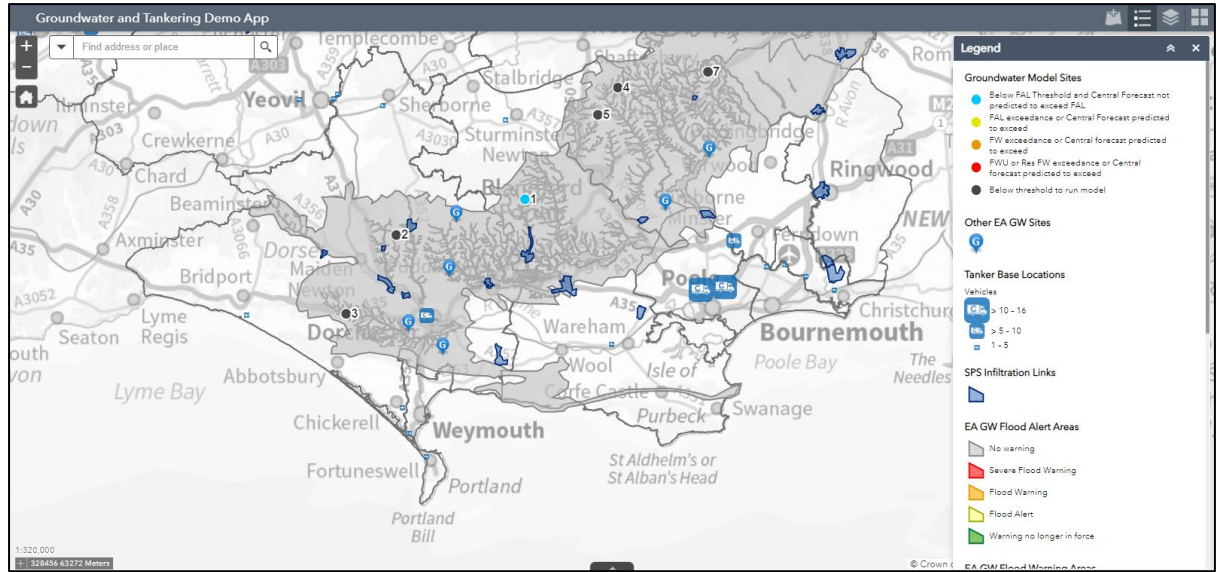
We hold regular meetings with Dorset Council to discuss flood risks and the Environment Agency. This resulted in Wessex Water contributing towards the Piddle Natural Flood Management project. This is an appraisal to attenuate flow in the upper catchments to reduce fluvial flood risk.

The Inflow Management Plan is available on [the DWMP Portal](#) and Wessex Water's [Website](#). We have promoted the availability of this and the other Infiltration Reduction plan summaries to stakeholders at flood risk management meetings with Lead Local Flood Authorities (LLFA's) and catchment partnerships meetings as part of our DWMP work.

Regular liaison with the Environment Agency regarding their groundwater flooding model, to inform Wessex Water's own internal response and reporting system.

Further work has been carried out to improve groundwater forecasting in the region in association with the EA. **Figure 4** shows the groundwater and tankering app which is being developed to assist operations with reactive work during times of high groundwater. Live data from the EA groundwater models is used to forecast groundwater flooding.

Figure 4: Groundwater and Tankering App



Dorset Council has consulted Wessex Water on a planning application for a small development of 9 residential units, offices, a café and 2 workshops, in accordance with our consultation strategy in areas at risk of groundwater inundation. Wessex Water’s planning liaison department will respond to see what mechanism can be instigated to provide potential betterment by inspecting the private laterals as part of the adoption process.

Section 4

Future works

Wessex Water plans to undertake the following work in the next year;

- Continue to deliver the Inflow Management Plan (see **Appendix 1**).
- Review recent CCTV surveys and site investigations by Wessex Water and undertake any appropriate remedial works as soon as practical.
- Continue to monitor the Barcombe Farm borehole levels as a trigger for preparedness against flooding issues within the Piddle Valley catchment.
- Further targeted inspections, if appropriate, using CCTV equipment to identify further sources of groundwater infiltration.
- Continued liaison with stakeholders through the Lead Local Flood Authority and Parish Council.
- Liaise with Dorset Council regards betterment on recent section 104 application
- Publish a version of this report on our website.
- Consider use of the EnTRADE Auction Platform to promote Natural Flood Management within the Piddle Valley as part of the Poole Harbour nitrogen offsetting project.
- Planned sealing to take place this year based on the results of the CCTV survey in August 2022

Appendix 1

Piddle Valley Inflow Management / Infiltration Reduction Plan

Requirements of the Permit:

1. Formulate and follow an Inflow Monitoring Plan (IMP) from date of issue of the two Pumped relief station permits issued 08/04/2011, constructed in September 2011
2. Review the effectiveness of the IMP annually and report to EA by 1st May
3. This applies to the first five years of operation of the pumped relief stations and will require a full review in 2016.

This inflow management plan also acts as an infiltration reduction plan.

Abbreviations:

WW	- Wessex Water
WDDC	- West Dorset District Council
DCC	- Dorset County Council
DC	- Dorset Council *
EA	- Environment Agency

(* created on 1 April 2019 to administer most of the area formerly administered by Dorset County Council, which was previously subdivided into the districts including West Dorset District Council)

Piddle Valley - Infiltration Reduction Plan

n/a	Achieved Completed	Achieved Monitor	Done	Ongoing	Short Term	Medium Term	Long Term
					<2 years	2-10 years	10 Years>

Action	Responsibility	Additional Input	Timescales	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Planned 2023 >	Comments
Review existing asset and operational data and produce an Infiltration Reduction Plan	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	
Review existing asset and operational data and produce Operational Mitigation Action Plan (OMAP)	Wessex Water		Annually	n/a	n/a	Short Term	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	
Review existing asset and operational data and produce Inflow Management Plan annual report	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	

Action	Responsibility	Additional Input	Timescales	2011/ 12	2012/ 13	2013/ 14	2014/ 15	2015/ 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	2021/ 22	2022/ 23	Planned 2023 >	Comments
Review existing catchment borehole data (possibly including data from the Environment Agency).	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	Three WW boreholes monitored in the Piddle Valley
Monitor sewer levels, to assess the success of inflow reduction both at the pumped relief chambers and at the WRC	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	
Add OMAP layer to DWMP Hub for Risk Management Authorities	Wessex Water		When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Short term	Done	Achieved complete d	
Follow procedure for responding to, investigating, resolving and recording operational contact incidents - (Rapid in place).	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	

Action	Responsibility	Additional Input	Timescales	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Planned 2023 >	Comments
Review historic and current telemetry and rainfall records and update.	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	
Communication with other authorities during times of elevated groundwater levels	Wessex Water	EA, LLFA, DC	When Applicable	Done	Done	Done	n/a	n/a	n/a	n/a	n/a	Done	Done	n/a	Done	Ongoing	
Continue customer engagement, via the Wessex Water website and public meetings when applicable	Wessex Water	EA, DC	Annually	n/a	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	Article in Piddle Valley News and on website (2012). Presentation to affected customer (2013). Summary reports shared to Parish Council 2013-2016).

Action	Responsibility	Additional Input	Timescales	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Planned 2023 >	Comments
Continue wider customer engagement, by putting IRPs and groundwater impact video on the Wessex Water website LINK	Wessex Water		Annually	n/a	n/a	n/a	n/a	Short Term	Done	Done	Done	Done	Done	Done	Done	Ongoing	Information developed on website 2015/16 Video added 2017/18
Develop Local Action Plan (At a high ground water level). Community flood warning plan EA and DCC to discuss 2013.	Wessex Water	EA, LLFA, DC, EHO	When Applicable	n/a	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	
Liaise with the Environment Agency with regards to their ground water warning modelling and service	Wessex Water	EA, LLFA	When Applicable	n/a	n/a	n/a	n/a	Long Term	n/a	n/a	Short Term	n/a	Done	Done	n/a	Achieved Monitor	Viewpoint Groundwater and Tankering App produced in 2020/21

Action	Responsibility	Additional Input	Timescales	2011/ 12	2012/ 13	2013/ 14	2014/ 15	2015/ 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	2021/ 22	2022/ 23	Planned 2023 >	Comments
Risk modelling of Wessex Water Assets to plan which catchments require proactive surveys as set out in Sewerage Risk Management Manual	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	
Undertake proactive inspection of public sewers as set out in Sewerage Risk Management Manual. Identify infiltration using CCTV	Wessex Water		Annually	Done	Done	n/a	Done	Done	Done	Done	n/a	n/a	Done	Done	Done	Ongoing	
CCTV and targeted infiltration studies according to analysis from previous surveys of s105a sewers where cost effective	Wessex Water		When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Long Term	To be completed after public sewers have been surveyed and assessed

Action	Responsibility	Additional Input	Timescales	2011/ 12	2012/ 13	2013/ 14	2014/ 15	2015/ 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	2021/ 22	2022/ 23	Planned 2023 >	Comments
Where areas of infiltration in private drainage systems are found, pass information on to the Council for further action. WW to consider funding private improvements.	Wessex Water	LLFA, DC	When Applicable	n/a	n/a	n/a	n/a	n/a	done	n/a	n/a	n/a	n/a	n/a	n/a	Long Term	Infiltration found in March 2016 was reviewed and sealed where cost effective in 2016/2017.
Continued sewer and manhole sealing of the public system where proven to be cost effective based on proactive inspections.	Wessex Water		When Applicable	Done	Done	Done	Done	Done	n/a	n/a	n/a	Done	n/a	n/a	n/a	Ongoing	
Analyse flows in the sewers, using historic and current telemetry, rainfall, flow surveys and modelling where appropriate.	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	

Action	Responsibility	Additional Input	Timescales	2011/ 12	2012/ 13	2013/ 14	2014/ 15	2015/ 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	2021/ 22	2022/ 23	Planned 2023 >	Comments
Routine review of telemetry; compare with borehole data, local watercourse data, rainfall data and customer incidents to assess residual levels of infiltration	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	
Continued monitoring of telemetry	Wessex Water		Routinely	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	Telemetry is monitored throughout the year and more frequently during times of high groundwater r
Pumped relief stations have been included in the EDM programme; spill data is reported to the EA annually	Wessex Water		Annually	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Done	Done	Done	Ongoing	

Action	Responsibility	Additional Input	Timescales	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Planned 2023 >	Comments
Appraisal of flooding incidents.	Wessex Water		When Applicable	n/a	n/a	n/a	n/a	n/a	Done	n/a	n/a	n/a	n/a	Short term	n/a	Ongoing	Review of High-Level Assessment
Existing highway outfalls to be inspected and if necessary, cleared of any build-up of silt.	LLFA		When Applicable	n/a	Done	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Ongoing	LLFA to confirm future actions
Identify road gullies and other impermeable area connected into the foul sewers and remove them where cost effective	LLFA		When Applicable	Done	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Achieved Completed	IAS completed 2011. No road gully connections found, minor area of roof connections to foul
Tankering in order to protect public health against sewer backing up and flooding.	Wessex Water		When Applicable	n/a	Done	Done	n/a	n/a	n/a	n/a	n/a	Done	Done	n/a	Done	Ongoing	

Action	Responsibility	Additional Input	Timescales	2011/ 12	2012/ 13	2013/ 14	2014/ 15	2015/ 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	2021/ 22	2022/ 23	Planned 2023 >	Comments
Over-pump in order to protect public health as a last resort if/when it is not feasible to protect public health by tankering	Wessex Water		When Applicable	n/a	Done	Done	n/a	Done	Done	Done	n/a	Done	Done	n/a	Done	Ongoing	
River quality sampling when over-pumping on alternate days upstream and downstream of discharge point.	Wessex Water		When Applicable	n/a	Done	Done	n/a	Done	Done	Done	n/a	Done	n/a	n/a	Done	Ongoing	
Investigate the use of Artificial Intelligence (AI) to code CCTV, increase survey efficiency and help identify defects and hotspots	Wessex Water		When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Ongoing	Market Place challenge complete, in use in regionally where appropriate

Action	Responsibility	Additional Input	Timescales	2011/ 12	2012/ 13	2013/ 14	2014/ 15	2015/ 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	2021/ 22	2022/ 23	Planned 2023 >	Comments
Use of Meteor Cameras to monitor area of high frequency maintenance and when OMAP is active	Wessex Water		When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Ongoing	
Use of machine learning and rainfall forecasting to predict flows in sewers	Wessex Water		When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Ongoing	Market Place challenge complete, in use in regionally where appropriate
Private Sewer Transfer Complete October 2011. Plot known laterals from CCTV	Wessex Water		When Applicable	Done	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Achieved Complete d	
Remedial works of private assets	Private		When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Long Term	
Inspection of private gullies, drains and manholes	Private	WW	When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Long Term	

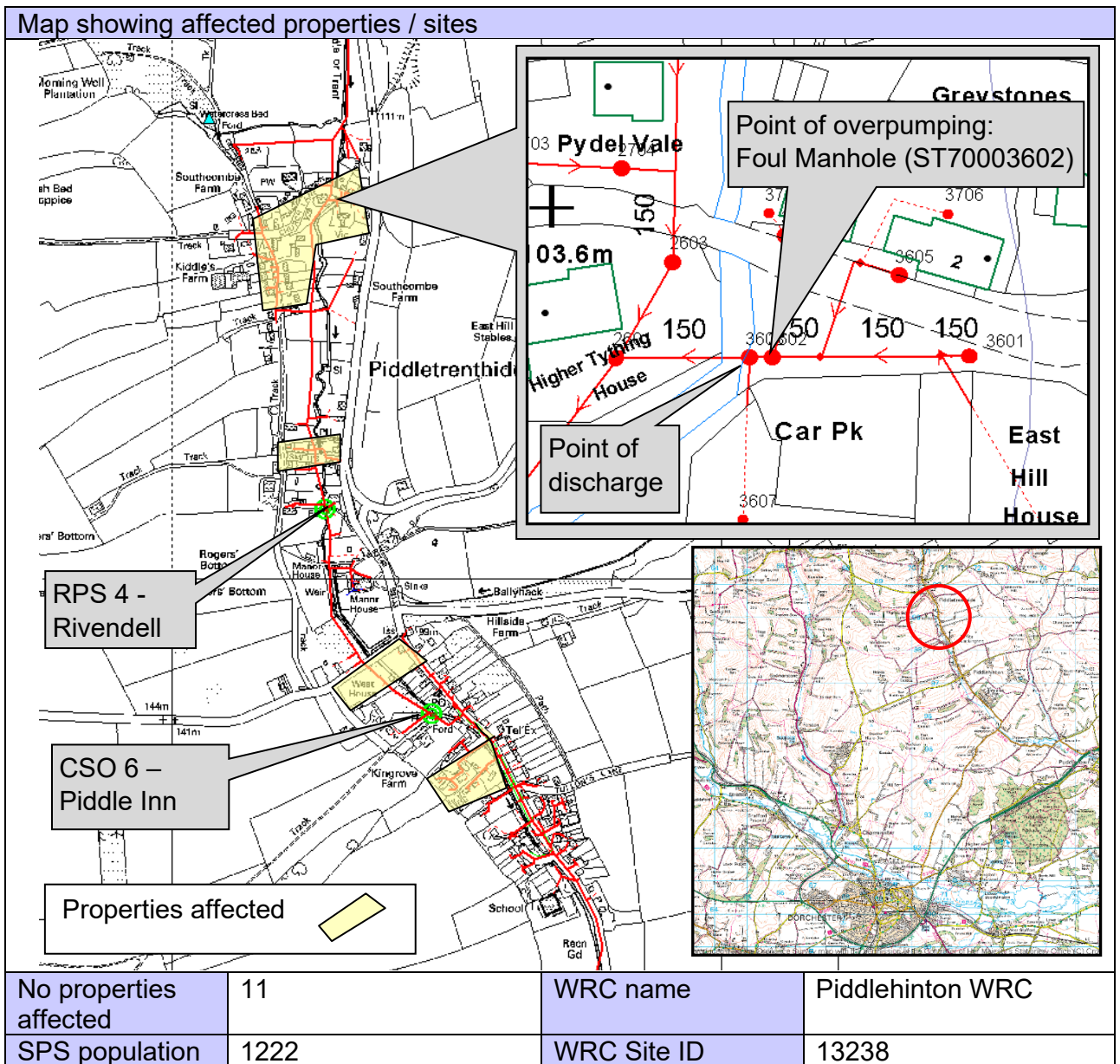
Action	Responsibility	Additional Input	Timescales	2011/ 12	2012/ 13	2013/ 14	2014/ 15	2015/ 16	2016/ 17	2017/ 18	2018/ 19	2019/ 20	2020/ 21	2021/ 22	2022/ 23	Planned 2023 >	Comments
Monitor and regulate surface water disposal to prevent surface water to foul misconnections.	Wessex Water		When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Long Term	
Consider sustainable solutions such as above ground attenuation	Wessex Water		When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Long Term	

Appendix 2

Operational Mitigation Action Plan (OMAP) Piddletrenthide

Catchment details

Location	Piddletrenthide	Council	West Dorset District
WRC catchment	Piddlehinton WRC	WRC Site ID	13238
		WRC population	1222



Historical consequences of inundation

Internal flooding	3	Restricted toilet use / Blockage Backing up	70
External flooding	34	Pollutions	13

Key operational contacts

WW name	Wessex Water	Telephone	24 hour service 0345 6004600
EA name	Environment Agency incident hotline	Telephone	Telephone (24 hour service) 0800 80 70 60
Notification	Only during normal working hours	Can pumps be mobilised before notification	Yes

Preparedness

Permission from landowner required	No	Does land owner need to be contacted	No
Borehole Trigger	Barcombe Farm	Level	123.0
Borehole NGR	ST 69922 03216		
EA groundwater warning	Wessex Water to be included in the EA warning email.	Consent details	Piddletrenthide; WRC: 040067 RPS4: EPR/AP3827XC RPS6: EPR/AP3822XS

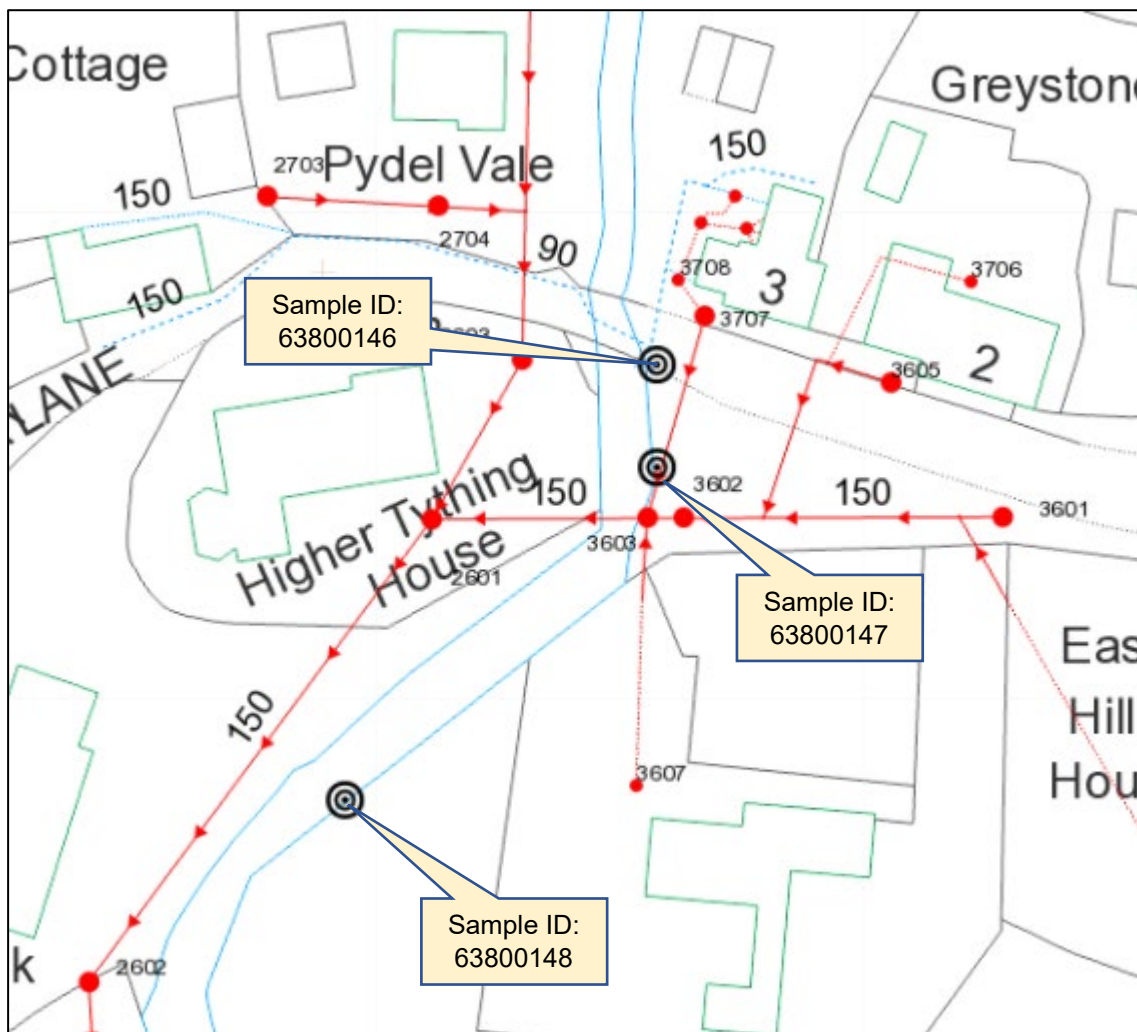
Trigger for tankering

Flooding / Surcharge	Manholes surcharge within 1m from flooding		
Tanker from	Foul manhole (ST70001401) adjacent Brookside, DT2 7QZ	Tanker to	Dorchester WRC (13096)
NGR:	ST 70204 00476	NGR:	SY 70964 90221
Tankering frequency	Daily	Night tankering	Yes

Triggers for pumping to river

Flooding / Surchage	Any risk of internal flooding or loss of service due to groundwater inundation		
Pump from	Foul manhole (ST70003602) adjacent to 3 Church Lane, DT2 7QY	Pump to	River Piddle, 10 metres downstream of road bridge
NGR:	ST 70302 00687	NGR:	ST 70302 00691
Discharge rate	<20l/s	Sensitivity of watercourse	3
Treatment arrangements	Copasac	Other requirements	Traffic management PR Plan

Sampling information



Sampling regime	Full Lab suite	Sampling frequency	3 times per week e.g.
-----------------	----------------	--------------------	-----------------------

			(Monday, Wednesday, Friday) then weekly
Sample ID Number	63800147	Point of Discharge	River Piddle, 10 metres downstream of road bridge
		NGR:	ST 70302 00691
Upstream sampling location	10 metres upstream of discharge point, adjacent to road bridge	Downstream Sampling location	40 metres downstream of discharge point adjacent to wall of car park
Sample ID Number	63800146	Sample ID Number	63800148
NGR:	ST 70302 00700	NGR:	ST 70275 00662
Standard sampling parameters	BOD, SS, Ammoniacal Nitrogen, pH and Total oxidised nitrogen	Deviations from normal sampling criteria	None

Trigger for ending of OMAP

Flooding / Surcharge	Surcharge in sewer reduces below flooding level and heavy rainfall is not forecast
----------------------	------------------------------------------------------------------------------------

Document Control

Issue nr	Date	Author	Comments
1	25/07/14	R Pearcey	First Draft
1a	05/08/14	H Wheeler	Amendments
2	07/09/14	R Trotman	Second Draft
3	06/01/15	R Trotman	EA comments / Final version

Key Contacts

WW	John Hole (Operational Sewerage Manager- South)	WW mobile	07825 853615
WW	Matt Kettle & Roz Chamberlaine	Email	inflow.infiltration@wessexwater.co.uk

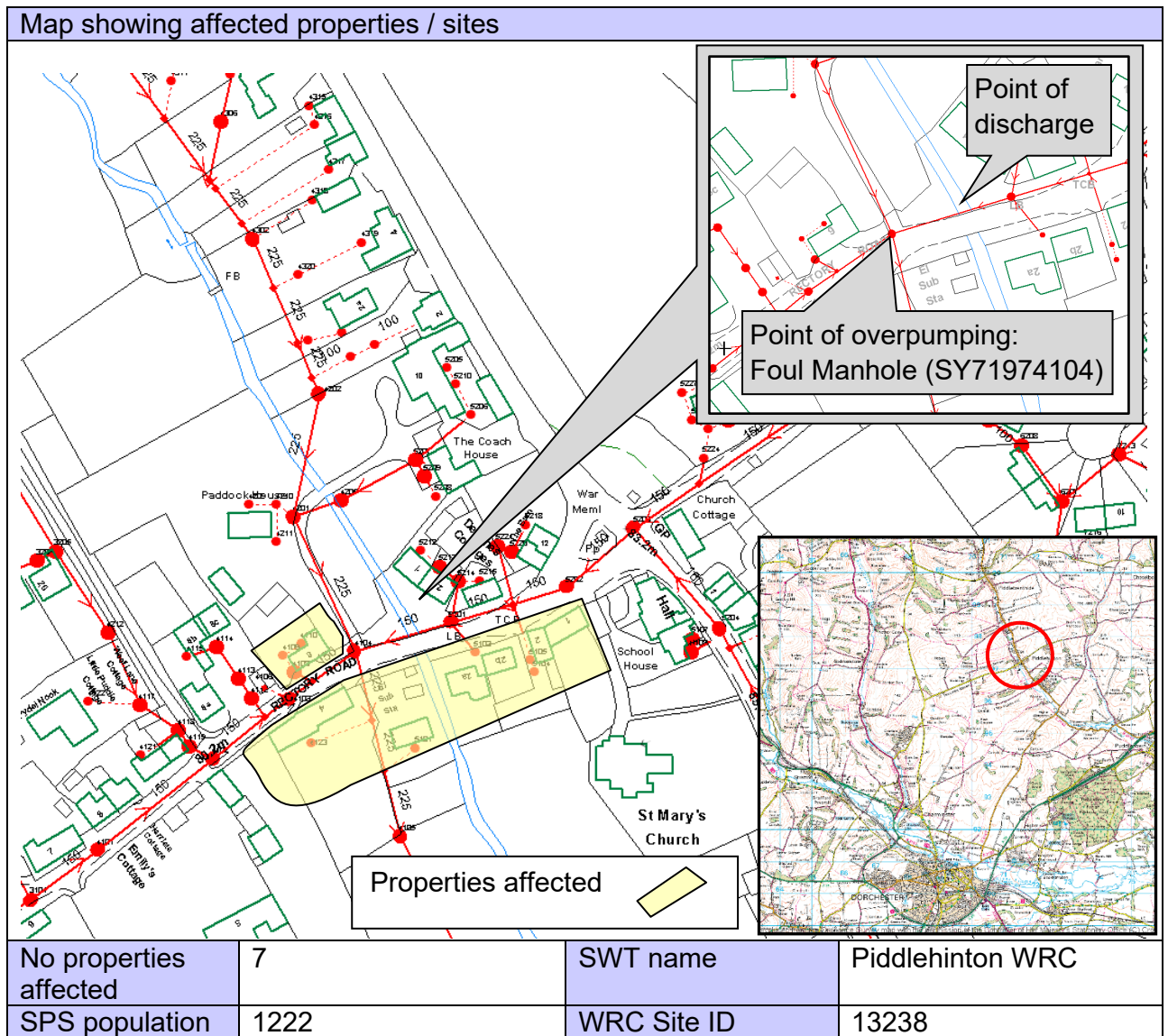
EA	Environment Agency Incident Hotline	Telephone	(24-hour service) 0800 80 70 60
Landowner		Telephone	
Tenant			

Appendix 3

Operational Mitigation Action Plan (OMAP064) Piddlehinton

Catchment details

Location	Piddlehinton	Council	West Dorset District
WRC catchment	Piddlehinton WRC	WRC Site ID	13238
		WRC population	1222



Historical consequences of inundation

Internal flooding	4	Restricted toilet use / Blockage Backing up	83
External flooding	39	Pollutions	15

Key operational contacts

WW name	Wessex Water	Telephone	24 hour service 0345 6004600
EA name	Environment Agency incident hotline	Telephone	Telephone (24 hour service) 0800 80 70 60
Notification	Only during normal working hours	Can pumps be mobilised before notification	Yes

Preparedness

Permission from landowner required	Yes	Does landowner need to be contacted	Yes
Borehole Trigger	Barcombe Farm	Level	123.0
Borehole NGR	ST 69922 03216		
EA groundwater warning	Wessex Water to be included in the EA warning email.	Consent details	Piddletrenthide; WRC: 040067 RPS4: EPR/AP3827XC RPS6: EPR/AP3822XS

Trigger for tankering

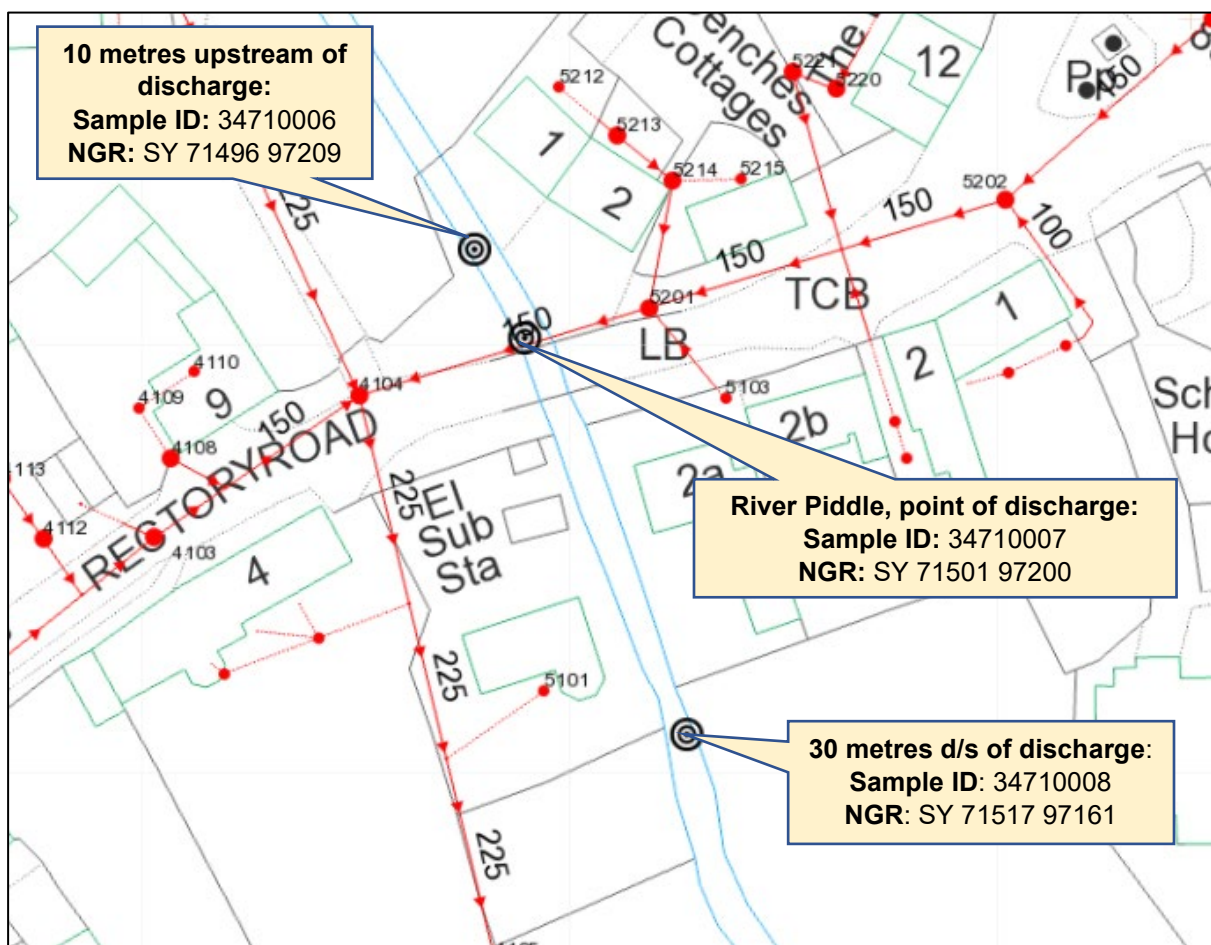
Flooding / Surcharge	Manholes surcharge within 1m from flooding		
Tanker from	Foul manhole (SY71974104) driveway entrance adjacent 9 Rectory Road, Piddlehinton, DT2 7TE	Tanker to	Dorchester WRC (13096)
NGR:	SY 71485 97195	NGR:	SY 70964 90221
Tankering frequency	Daily	Night tankering	No

Triggers for pumping to river

Flooding / Surcharge	Any risk of internal flooding or loss of service due to groundwater inundation
-------------------------	-----------------------------------------------------------------------------------

Pump from	Foul manhole (SY71974104) driveway entrance adjacent to 9 Rectory Road, Piddlehinton, DT2 7TE	Pump to	River Piddle, adjacent to road bridge
NGR:	SY 71485 97195	NGR:	SY 71501 97200
Discharge rate	<20l/s	Sensitivity of watercourse	3
Treatment arrangements	Copasac	Other requirements	Traffic management PR Plan

Sampling information



Sampling regime	Full Lab suite	Sampling frequency	3 times per week e.g. (Monday, Wednesday, Friday) then weekly
Sample ID Number	River Piddle, point of discharge: 34710007	Point of Discharge	River Piddle, adjacent to road bridge

		NGR:	SY 71501 97200
Upstream sampling location	10 metres upstream of discharge point, adjacent to garden wall	Downstream Sampling location	30 metres downstream of discharge point beyond garden of 3 Rectory Road, DT2 7TE (access required).
Sample ID Number	34710006	Sample ID Number	34710008
NGR:	SY 71496 97209	NGR:	SY 71517 97161
Standard sampling parameters	BOD, SS, Ammoniacal Nitrogen, pH and Total oxidised nitrogen	Deviations from normal sampling criteria	None

Trigger for ending of OMAP

Flooding / Surcharge	Surcharge in sewer reduces below flooding level and heavy rainfall is not forecast
----------------------	------------------------------------------------------------------------------------

Document Control

Issue nr	Date	Author	Comments
1	03/05/2017	R Chamberlaine	First Draft
2	10/01/2023	S Rawes	Sampling point IDs added

Key Contacts

WW	John Hole (Operational Sewerage Manager- South)	WW mobile	07825 853615
WW	Matt Kettle & Roz Chamberlaine	Email	inflow.infiltration@wessexwater.co.uk
EA	Environment Agency Incident Hotline	Telephone	(24-hour service) 0800 80 70 60
Landowner		Telephone	
Tenant			

Appendix 4

Boreholes vs RPS Pump Run Times

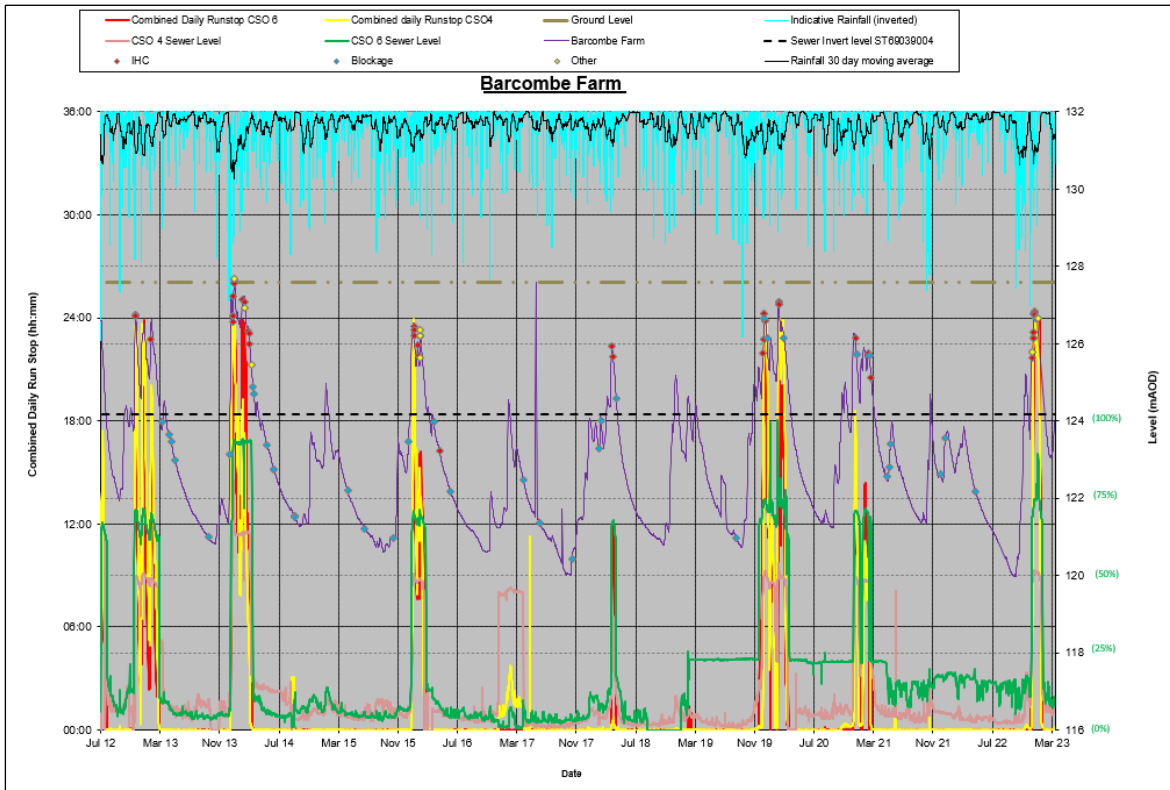


Figure A4a: Barcombe Farm borehole vs Sump and Pump Run time.

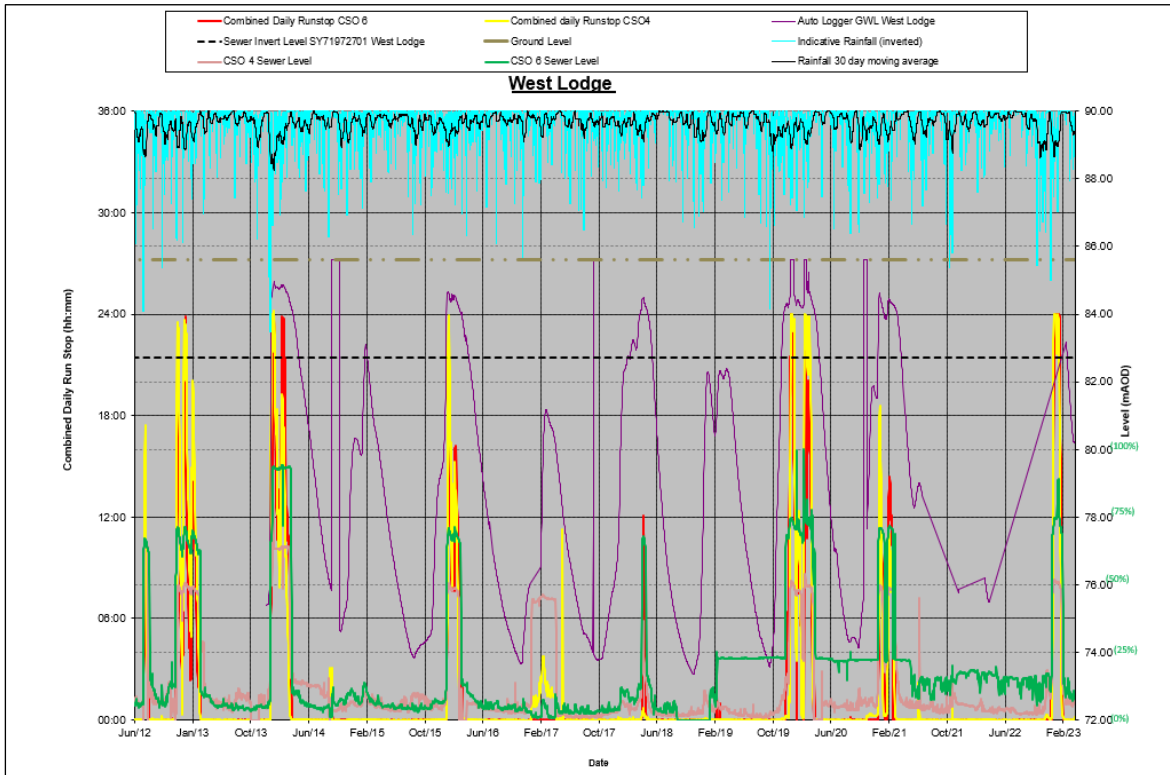


Figure A4b: West Lodge borehole vs Sump and Pump Run time.

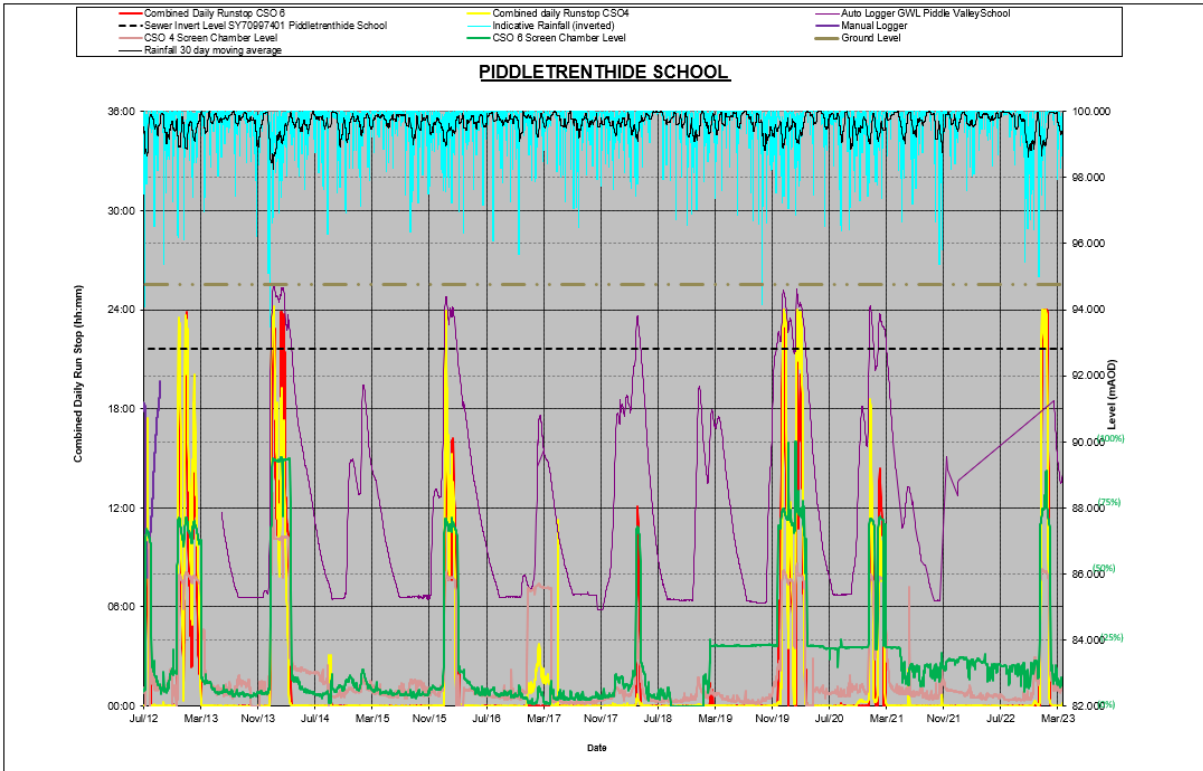


Figure A4c: Piddletrenthide School borehole vs Sump and Pump Run time.

Appendix 5

Sampling Locations

30602001 Sampling Point A: ST 70271 00229 - river c.100m u/s of the Rivendell RPS

Take sample from the bridge, u/s side and mid-channel.



30602002 Sampling Point B: SY 70359 99861 - river c.300m d/s of the Rivendell RPS

- river c.150m u/s of the Piddle Inn RPS

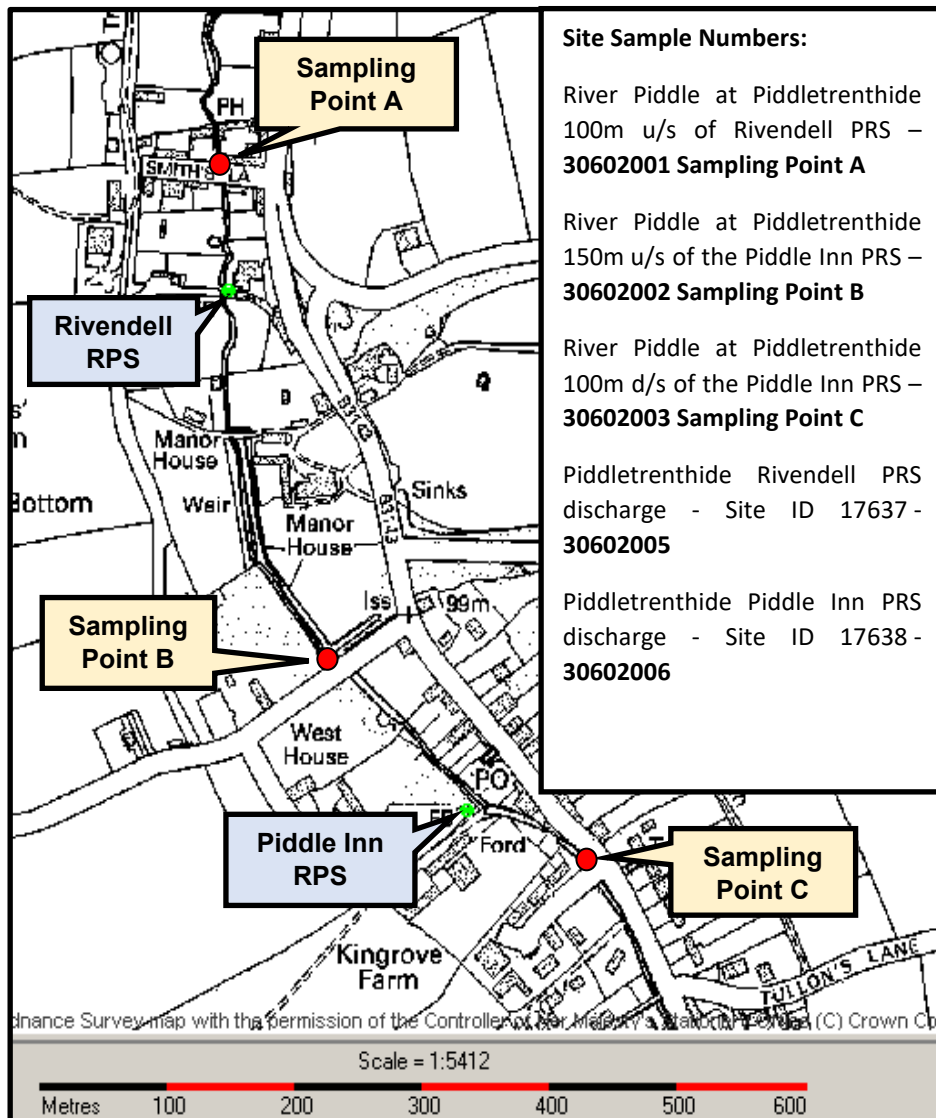
Take sample from bridge, u/s side and slightly towards the left-hand side of the bridge span.





30602003 Sampling Point C: SY 70559 99713 - river c.100m d/s of the Piddle Inn RPS

Take sample from bridge, u/s side and mid-channel



Appendix 6

Sampling Results

Piddletrenthide

Date	Site Sample Number	BOD atu - less than (mg O ₂ /l)	Susp solids (mg/l)	Ammonia as N (mg N/l)	Tot oxid N (mg N/l)
01/12/14	30602005				
	30602006				
	30602001	2	5	0.02	7.7
	30602002	2	5	0.02	7.7
	30602003	2	6	0.02	7.6
17/12/14	30602005				
	30602006				
	30602001	6	23	0.02	7.6
	30602002	6	19	0.02	7.5
	30602003	6	16	0.02	7.5
05/01/15	30602005				
	30602006				
	30602001	6	21	0.03	7.7
	30602002	6	17	0.03	7.8
	30602003	6	21	0.02	7.8
07/01/16	30602005	12	12	0.746	8.2
	30602006	9	16	0.642	7.8
	30602001	2	35	0.02	6.9
	30602002	4	34	0.03	6.4
	30602003	4	39	0.04	6.4
26/01/16	30602005	21	16	1.58	6
	30602006	13	18	1.69	7.5
	30602001	6	19	0.02	7.7
	30602002	6	13	0.03	7.5
	30602003	6	11	0.03	7.5
01/03/16	30602005	9	17	1.16	6
	30602006	13	17	1.52	4.9
	30602001	4	9	0.02	8.1
	30602002	4	9	0.03	7.9
	30602003	4	14	0.06	7.8
09/02/17	30602005	14	33	2.36	7.2
	30602006	6	15	0.4	7.7
	30602001	2	14	0.02	7.3
	30602002	2	16	0.12	7.3
	30602003	4	20	0.1	7.2
27/02/17	30602005	171	274	54.7	0.2
	30602006				
	30602001	6	16	0.02	7.25
	30602002				
	30602003				
24/03/17	30602005	222	252	33.3	
	30602006				
	30602001	2	7	0.02	
	30602002	2	13	0.27	
	30602003	2	11	0.2	

Date	Site Sample Number	BOD atu - less than (mg O ₂ /l)	Susp solids (mg/l)	Ammonia as N (mg N/l)	Tot oxid N (mg N/l)
16/04/18	30602005	15	23	1.82	
	30602006	15	31	2.23	
	30602001	2	8	0.02	
	30602002	2	7	0.02	
	30602003	2	8	0.02	
02/05/18	30602005	47	67	2.65	4.7
	30602006	63	94	5.15	4.1
	30602001	2	23	0.02	6.3
	30602002	3	27	0.02	6
	30602003	2	26	0.02	6
19/12/19	30602005	7	11	1.77	6.1
	30602006	8	14	1.49	6.3
	30602001	4.0	8	0.02	6.5
	30602002	2	13	0.02	6.2
	30602003	3	9	0.28	6.2
30/12/19	30602005	9	15	1.9	6.3
	30602006	11	13	0.958	6.2
	30602001	2.0	8	0.02	7
	30602002	2.0	9	0.04	6.8
	30602003	4	12	0.31	6.5
20/01/20	30602005	14	29	2.17	5.5
	30602006	6	10	1.51	5.9
	30602001	2.0	9	0.02	7.3
	30602002	2.0	8	0.03	7.3
	30602003	2.0	8	0.04	7.2
31/01/20	30602005	9	18	3.82	5.3
	30602006	10	19	3.07	5.6
	30602001	2.0	8	0.02	7.5
	30602002	2.0	7	0.03	7.4
	30602003	2.0	8	0.03	7.3
24/02/20	30602005	6	8	0.537	6.5
	30602006	4	5	0.4	6.6
	30602001	2.0	5	0.04	7
	30602002	2.0	5	0.03	6.9
	30602003	2.0	7	0.09	6.6
24/03/20	30602005	31	31	3.83	4.6
	30602006	20	27	2.85	4.9
	30602001	2.0	6	0.02	7.6
	30602002	2.0	6	0.02	7.4
	30602003	2.0	6	0.02	7.4
21/12/21	30602001	2	13	0.04	5.2
	30602002	2.0	9	0.020	7.2
	30602003	2.0	10	0.020	7.1
	30602004	*	11	0.400	8.1
04/01/23	30602001	2.0	14	0.020	7.0
	30602002	2.0	14	0.020	6.8
	30602003	2.0	13	0.020	6.7
17/01/23	30602001	2.0	14	0.020	7.1
	30602002	2.0	10	0.020	6.9
	30602003	2.0	7	0.020	6.6
	30602001	2.0	8	0.020	7.2
	30602002	2.0	8	0.020	6.9

Date	Site Sample Number	BOD atu - less than (mg O ₂ /l)	Susp solids (mg/l)	Ammonia as N (mg N/l)	Tot oxid N (mg N/l)
02/02/23	30602003	2.0	8	0.030	6.9
16/02/23	30602001	2.0	8	0.020	7.0
	30602002	2.0	8	0.020	7.1
	30602003	2.0	8	0.020	7.0
	30602005	2.0	8	0.4	6.9
	30602006	2.0	7	0.4	6.9

Piddlehinton OMAP 64

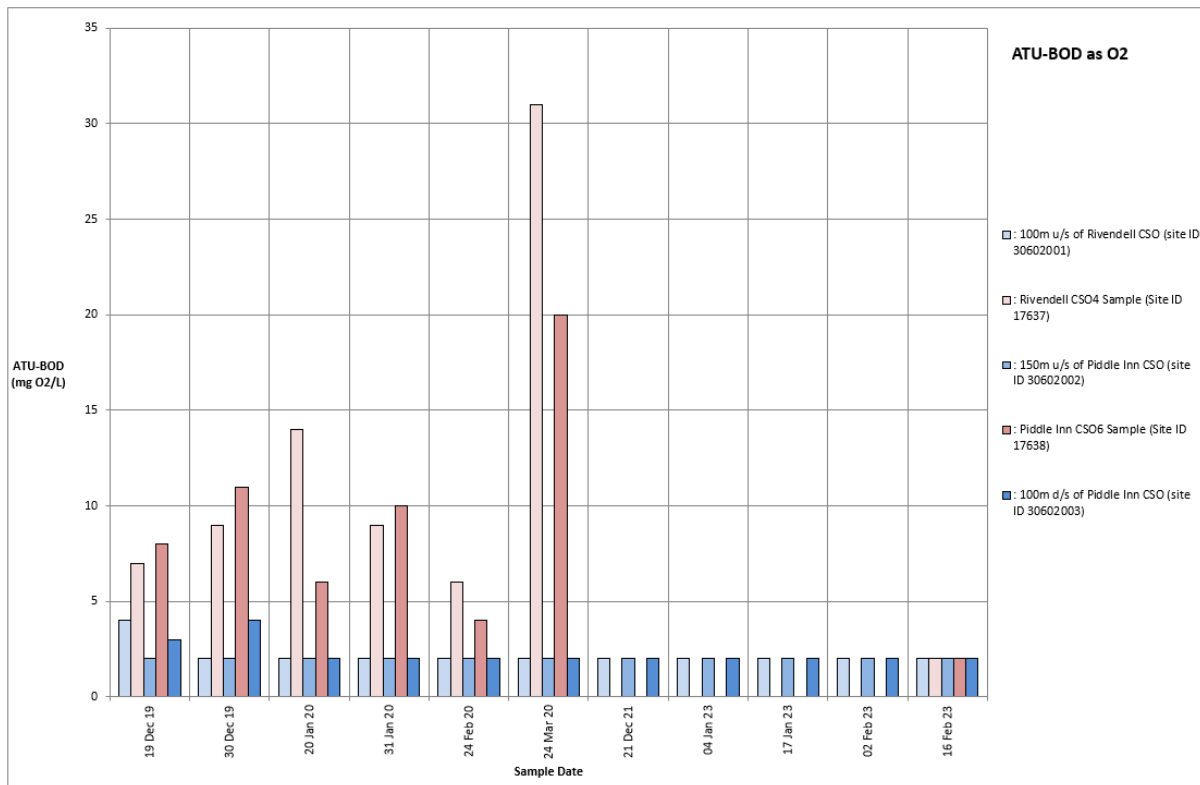
Date	Site Sample Number	BOD atu - less than (mg O ₂ /l)	Susp solids (mg/l)	Ammonia as N (mg N/l)	Tot oxid N (mg N/l)
17/01/2023	34710006	<2.0	<5	<0.400	7.2
	34710007	<6.0	<5	<0.400	7.2
	34710008	<2.0	<5	0.578	7.6
18/01/2023	34710006	<2.0	<5	<0.400	7.5
	34710007	2	<5	<0.400	7.6
	34710008	<2.0	<5	<0.400	7.6
20/01/2023	34710006	<2.0	<5	<0.400	7.2
	34710007	<8.0	<5	<0.400	7.3
	34710008	<6.0	<5	<0.400	7
24/01/2023	34710006	<8.0	7	<0.400	7.6
	34710007	<6.0	6	<0.400	7.7
	34710008	<8.0	6	<0.400	7.6
01/02/2023	34710006	<6.0	7	<0.400	7.4
	34710007	<6.0	8	<0.400	7.1
	34710008	<6.0	17	<0.400	7.1
09/02/2023	34710006	<2.0	6	<0.400	7.5
	34710007	<2.0	6	<0.400	7.5
	34710008	2	7	<0.400	7.5
16/02/2023	34710006	<2.0	9	<0.400	6.9
	34710007	2	9	<0.400	6.8
	34710008	<2.0	10	<0.400	7

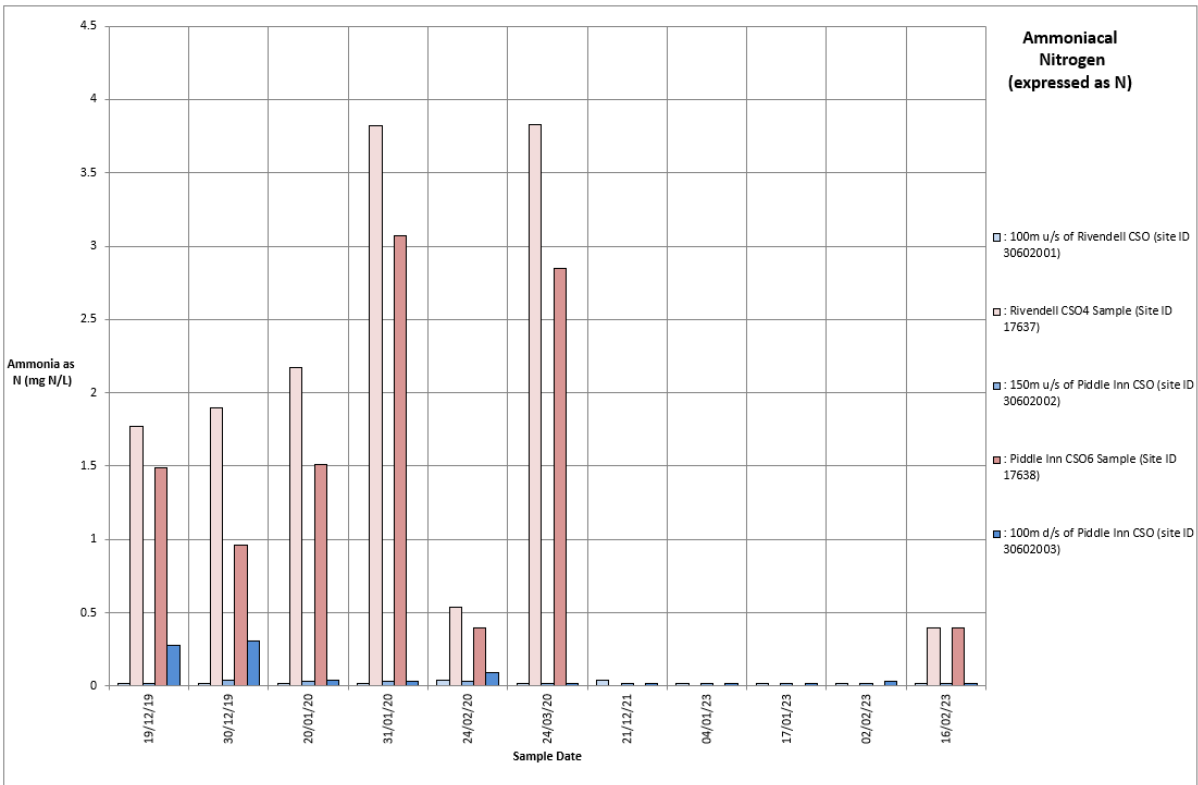
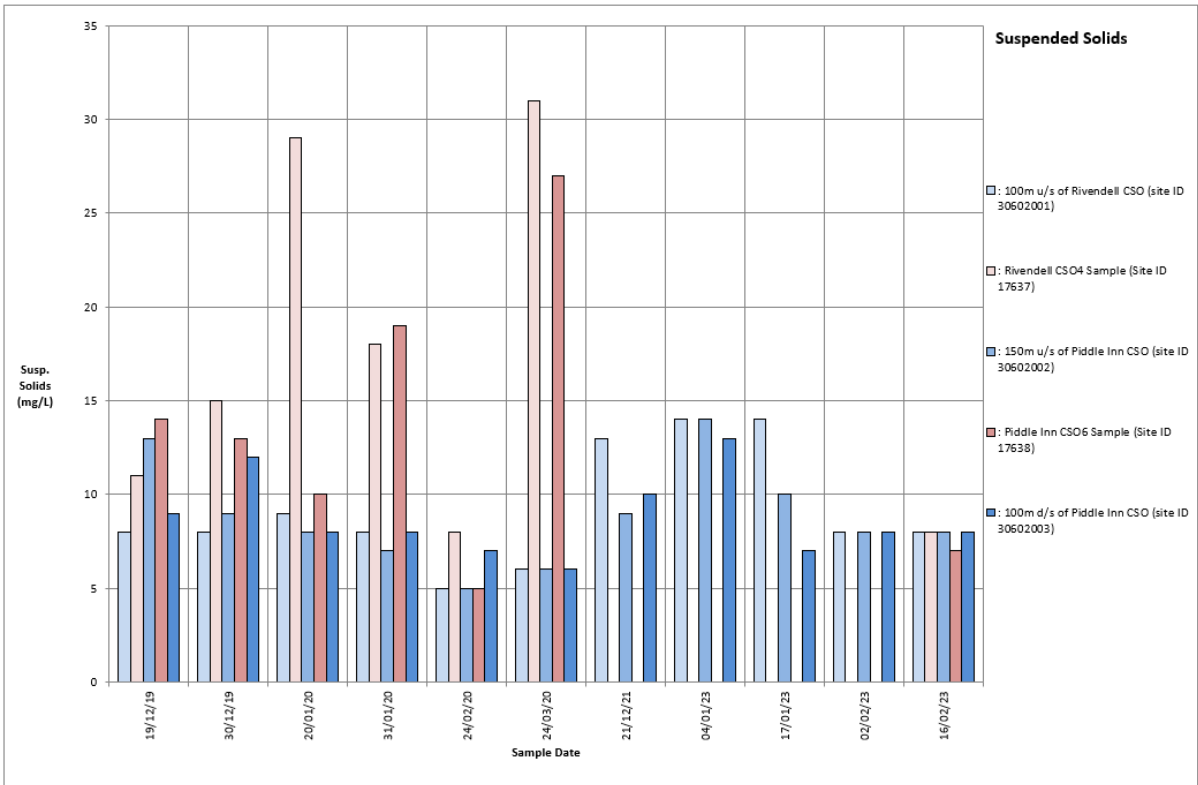
Appendix 7

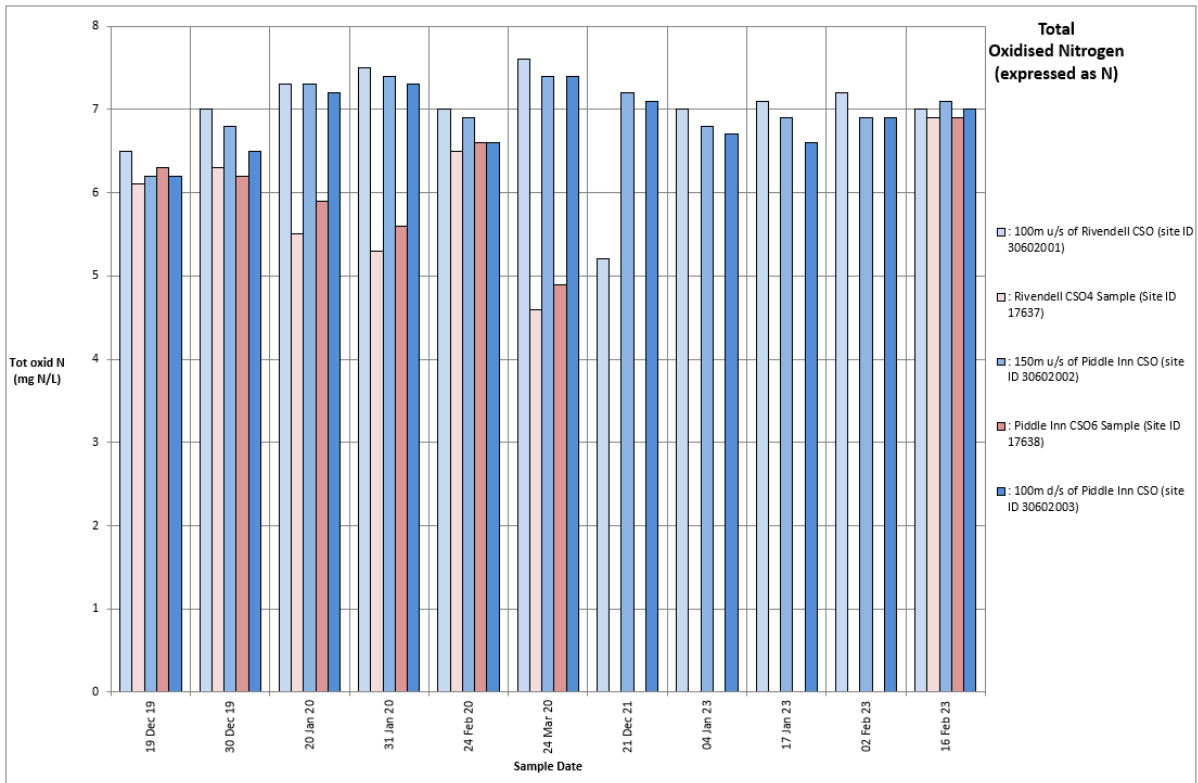
Piddlehinton WRC Permit Limits

Name	Consent	Unit	Limit	Winter	Start	End
Ammoniacal Nitrogen	5	mg/l	95%	10	01-Nov	30-Apr
Biochemical Oxygen Demand ATU	15	mg/l	95%	20	01-Nov	30-Apr
Suspended Solids	15	mg/l	95%	30	01-Nov	30-Apr

Sampling







Appendix 8

Groundwater Liaison

Date	Work Completed	Attendees
22/03/2019	Presentation from EA on Environment Agency Groundwater Flood warning service and start exploring partnership opportunities	WW, EA
20/02/2020	Meeting to discuss the groundwater forecasts and how we might be able to work together developing them further / future partnership working opportunities	WW, EA
15/10/2020	Discuss setting up a jointly funded partnership with Wessex Water (and any others) to enable the further development of the Groundwater Flood Warning / Forecasting service	WW, EA
25/11/2020	Discuss extending the thresholds of the existing groundwater forecasts and try developing some new forecasts on additional sites beyond the chalk	WW, EA
07/10/2021	Kick off Wessex Water Input into the groundwater collaboration project to add thresholds into EA Groundwater flood warning service	WW, EA
14/02/2022	Wessex Water thresholds and discussion on how this can be integrated into the EA Flood Warnings	WW, EA

Appendix 9

Piddletrenthide Case Study

Piddletrenthide Flood Alleviation

A case study in innovative permitting to resolve groundwater induced flooding of domestic properties

How joint working between a sewerage company, the environmental regulator and the local authority has enabled a pragmatic and sustainable solution to a long standing problem.

Groundwater Flooding

Piddletrenthide lies in a chalk valley in Dorset straddling the river Piddle. Most winters the water table rises to ground level causing localised flooding. When this occurs the sewerage system is effectively used as a land drainage network as residents have no option to protect their properties but to direct surface water down manholes. For many years the Environment Agency (EA) allowed Wessex Water, under emergency powers, to pump out the sewerage system to the local stream at two locations in the village in order to provide a positive drainage system to the residents. This was not an officially permitted arrangement and overland temporary pumping made it very unsightly.

A pragmatic and sustainable solution

A new groundwater land drainage scheme for the villages along the Piddle would have been very expensive and only been beneficial for a few weeks every year. Similarly, upsizing the sewer network's capacity and the downstream sewage works would have also been a very expensive and unsustainable option. Neither option was cost beneficial. The challenge was, how could the three parties – the EA, Wessex Water and Dorset CC, come up with a pragmatic and sustainable solution to remove the risk of property flooding for wet winter periods of high groundwater?

The solution involved an **innovative permitting arrangement**. The EA agreed to permit two pumped, screened overflows only for periods when groundwater was about to cause flooding. A condition of the consent was that Wessex Water signed up to an **Inflow Management Plan**

(IMP): a commitment to monitor groundwater levels, keep the integrity of the public sewer network under review (through CCTV inspection), carry out remedial work where necessary and work with the local authority to ensure private drains were also in good condition. The IMP also requires water quality sampling if and when pumping occurs in order to demonstrate that there is no adverse impact on the watercourse resulting from pumping station operation. An annual IMP report is also required to record activity carried out in the preceding year.



Pumping station weir and screening arrangement under construction



One of the completed and unobtrusive pumping stations next to the R. Piddle

Conclusion

Permanently reducing groundwater induced flood risk for Piddletrenthide was only possible because of an innovative and unique permitting arrangement between the EA and Wessex Water.

Appendix 10

Infiltration Investigations and Sealing

The tables below for sealing surveys in Piddlehinton and Piddle valley are found below:

All infiltration related works since April 2011

Financial year	Description	CCTV Ref	Length Inspected (m)	Sealing Scheme(s)	Amount Sealed
2011-12	Infiltration investigations and sealing of 13m patch lining	WD0397	16473	C9607	13m
2012-13	Infiltration investigations	CCTV114673	2019	-	-
2013-14	Infiltration investigations	CCTV116014, CCTV116020	258	-	-
2014-15	Infiltration investigations and 24m patch lining	CCTV117590	1262	C9607	24m
2015-16	Infiltration investigations	CCTV118911	1191	-	-
2016-17	Infiltration investigations and sealing of 212m full length	CCTV120526, CCTV120574	1051	CJ269	212m
2017-18	Infiltration investigations	CCTV121790	2442	-	-
2018-19	Infiltration investigations and sealing of 113m of full length and patch lining	CCTV121946, CCTV122621, CCTV123083, CCTV122381	1720	CJ269, CL426	113m
2019-20	Infiltration investigations	CCTV123168, CCTV124045	3952	-	-
2020-21	Infiltration investigations and MH sealing	SAST001162	78	CN0092	14no. MHs
2021-22	Infiltration investigations	-	-	-	-
2022-23	Infiltration investigations	SAST006217	-	-	-

Summary of sewer sealing in the catchment

Date	Description	Catchment(s)	Scheme	Lengths sealed	Meterage (m)
Jul 2007	Full length sewer lining	Piddlehinton WRC	CR111	2no. full length	164
Jan 2012	Patch lining	Piddlehinton WRC	C9607	8no. patch	13
Jul 2014 - Jan 2015	Patch lining	Piddlehinton WRC	C9607	8no. patch	24
Nov - Dec 2016	Full length sewer lining	Piddlehinton WRC	CJ269	8no. full length	212
Feb 2019	Full length sewer lining	Piddlehinton WRC	CJ269	1no. full length	8
Feb 2019	Full length and patch lining	Piddlehinton WRC	CL426	2no. full length, 10no. patch	105

Manhole sealing to date

Date	Description	Catchment(s)	Scheme	MHs sealed
2015	Manhole sealing as part of infiltration investigations scheme	Piddlehinton WRC	C9607	1
Aug - Nov 2020	Manhole sealing as part of infiltration investigations scheme	Piddlehinton WRC	CN0092	14

All CCTV surveys to date

Date	Description	Catchment(s)	Survey	Scheme	Length inspected (m)
Nov 2006 - Jan 2007	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	WD0275	C9166	2637
Mar 2011	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	WD0397	-	2851

Apr - Sep 2011	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	WD0397	-	16473
Feb - Mar 2013	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV114673	-	2019
Dec 2013	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV116014	-	41
Dec 2013	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV116020	-	217
Feb 2015	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV117590	-	1262
Mar 2016	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV118911	-	1191
Nov 2016	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV120526	CJ269	143
Mar 2017	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV120574	C9837	908
Feb 2018	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV121790	-	2442
Apr 2018	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV121946	-	745
Sep - Oct 2018	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV122621	C9837	418
Feb 2019	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV123083	CL426	558
Mar 2019	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV122381	CL346.	0
Apr 2019	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV123168	C9837	1727
Jan - Feb 2020	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV124045	-	2225
Jan 2021	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	SAST001162	C9837	78

